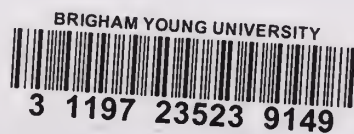


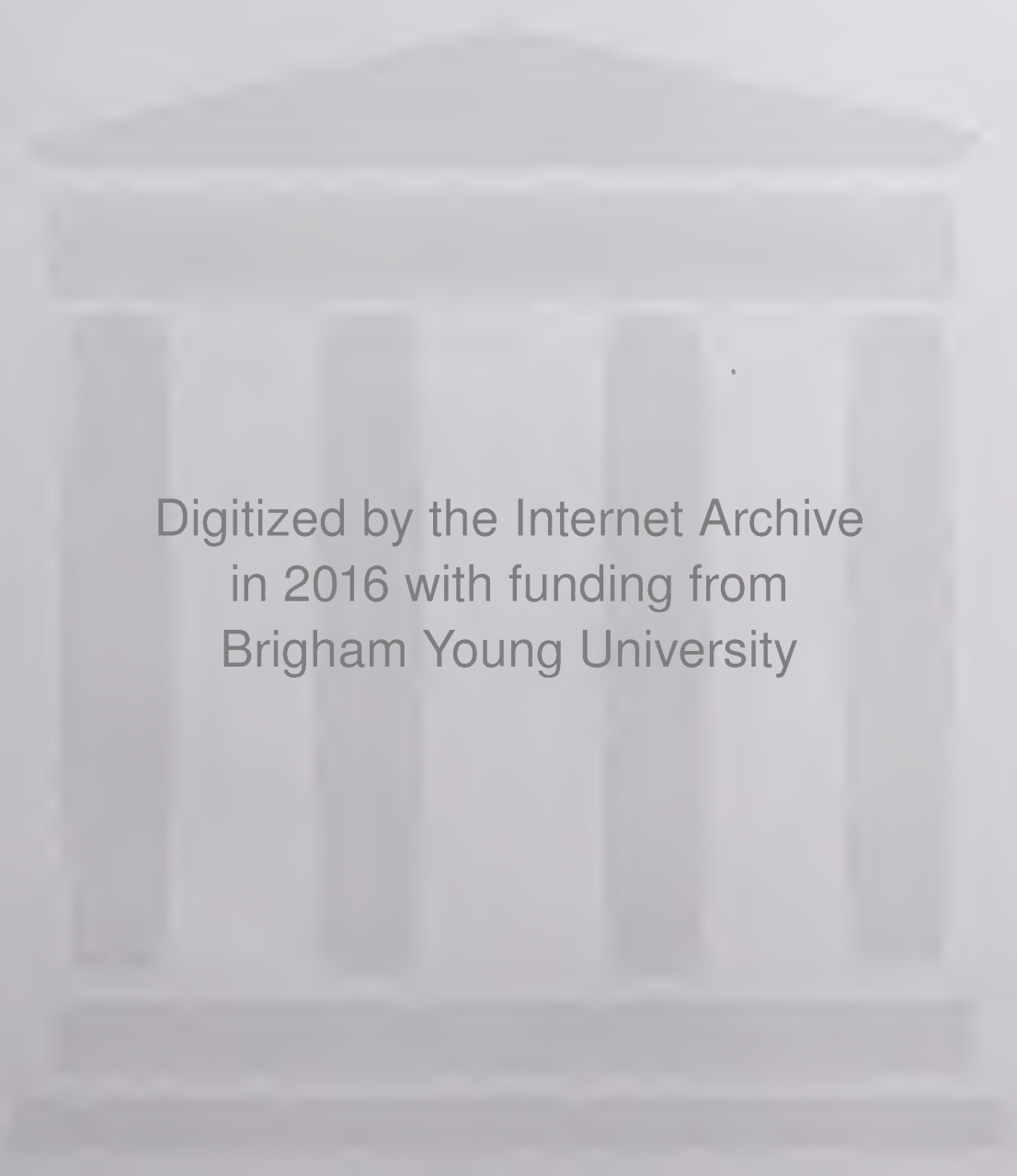
University Archives

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B R I G H A M Y O U N G U N I V E R S I T Y B U L L E T I N

G R A D U A T E C A T A L O G

**1996-97
GRADUATE
CATALOG**

**BRIGHAM
YOUNG
UNIVERSITY
BULLETIN
USPS No. 065-120**

To order a copy of this catalog, please send \$5, plus \$1.50 for postage and handling, to Mail Services, 296 UPB, Brigham Young University, Provo, UT 84602.

About This Catalog

The university makes every effort to ensure the accuracy of the contents of this catalog but reserves the right to make changes at any time without prior notice. Since change is a part of university life, curriculum and program changes will likely occur during the time the 1996-97 Graduate Catalog is in circulation. Students are advised to consult the following sources for current and specific information:

1. The appropriate university department or advisor.
2. The class schedule, printed three times a year, which includes up-to-date information on courses offered, class hours, class locations, and the latest calendar dates, fees, and registration details.

It is the student's responsibility to learn of and abide by current policies and requirements. In the event of change, every reasonable effort will be made to permit students affected to complete their programs or similar programs.

Policies and requirements in the General Information section of this catalog reflect standards of minimum performance and may be less stringent than those established by individual departments. Most departments have printed materials of their own describing in detail their programs, deadlines, expectations, and opportunities for financial assistance. Therefore, any potential applicants should notify prospective departments of their interest and request printed information from those departments. Because some application deadlines are as early as January for fall admission, and some departments admit new students only once a year, early inquiry is recommended.

The Law School and the Graduate School of Management require different application forms than that used for other graduate programs. Furthermore, the Law School publishes its own bulletin and follows a different calendar. Prospective applicants to these professional schools should write directly to them.

Statement of Nondiscrimination—Admission to Brigham Young University is nondiscriminatory. The university admits persons regardless of race, color, national origin, religion, age, gender, veteran status, or disability who meet university and department academic requirements and agree to abide by the university's standards of conduct and honor code.

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Where to Write or Call for Information

(Complete the following addresses with *Provo, UT 84602*-, inserting the last four digits of the PO box after the hyphen in the zip code.)

General Information on Graduate Education

Office of Graduate Studies
B-356 ASB, PO Box 21339
(801) 378-4091

Campus Tours

Visitors Center, PO Box 23200
(801) 378-4678

Graduate School of Management

730 TNRB, PO Box 23113
(801) 378-4123

International Services

350 SWKT, PO Box 25520
(801) 378-2695

Law School Admissions

340 JRCB, PO Box 28000
(801) 378-4277

Records

B-150 ASB, PO Box 21114
(801) 378-2631

Registration

B-130 ASB, PO Box 21114
(801) 378-2824

Scholarships and Awards

Individual academic departments

Student Employment Services

C-40 ASB, PO Box 21004
(801) 378-3561

Student Housing

On-Campus Housing Office
100 SASB, PO Box 21820
(801) 378-2611
Off-Campus Housing Office
255 ELWC, PO Box 27905
(801) 378-5066

Student Loans

Financial Aid Office
A-41 ASB, PO Box 21009
(801) 378-4104

Tests (GRE, GMAT, LSAT, and Miller)

Testing Services
265 HGB, PO Box 22701
(801) 378-6129

Tuition and Fees

Cashiers' Office
D-155 ASB, PO Box 21128
(801) 378-7808

Veterans Support Office

B-150 ASB, PO Box 21113
(801) 378-2768

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BRIGHAM Young University offers an exceptional educational opportunity for the well-prepared graduate student who is seeking an environment where learning experiences with dedicated scholars characterize graduate study. Established and sponsored by The Church of Jesus Christ of Latter-day Saints, BYU is the largest privately owned university in the United States. The university president, Merrill J. Bateman, is directly responsible to the board of trustees, led by the president of The Church of Jesus Christ of Latter-day Saints and composed of Church authorities. In a time of constantly changing human values and increased challenges for higher education, BYU holds steadfastly to a singular vision that combines reasoned and revealed learning. Along with extensive undergraduate programs, BYU offers master's and doctoral degrees in a variety of disciplines through fifty-five graduate departments. In addition, the Law School and the Marriott School of Management offer professional graduate degrees.

Founded in 1875 as Brigham Young Academy, the campus has grown from one building to 500 buildings on more than 600 acres. Its first class of twenty-nine students was taught by the academy's founding scholar, Karl G. Maeser. Now nearly 1,400 full-time faculty instruct 28,000 students. From its modest beginnings Brigham Young University has grown to become one of the nation's most distinguished institutions of private higher education. At BYU teaching and scholarly research are valued as essential complements of one another. Faculty and students work side by side in collegial scholarship enhanced by mutual commitment to the highest ideals of professional ethics and spiritual values.

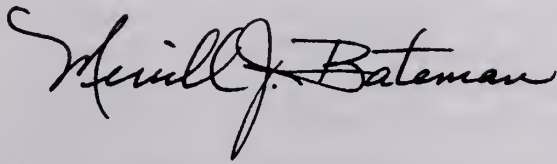
Situated at the foot of the beautifully rugged Wasatch Range of the Rocky Mountains and bounded on the west by twenty-three-mile-long Utah Lake, the campus is the focal point of a city of 90,000 and a valley of 250,000. Beyond it to the south and east are spectacular areas of vast sandstone canyons and monoliths, several of which are national parks. Forty-five miles north is Salt Lake City.

The faculty at BYU have been schooled at some of the leading universities of the nation as well as of other countries, and many of them have achieved national and international prominence as teachers and scholars.



WITH this Brigham Young University Graduate Catalog let me welcome you to the university and to graduate studies. Your successful completion of an undergraduate degree has laid the groundwork for advanced study, but you will find that graduate work offers a new set of experiences. In the main, an undergraduate student tries to assimilate a largely prescribed set of skills and information that are already known by others. An undergraduate student, therefore, is primarily a consumer of knowledge. A graduate student must learn to become a contributor as well as a consumer, someone who expands the world's store of knowledge. Faculty members and graduate students are partners in this important endeavor. Our libraries, laboratories, studios, museums, institutes, and centers will be home to you during the years you spend at Brigham Young University, and they will assist you in your graduate pursuits.

In the pages that follow you can learn about the university's degree requirements, procedures, and course offerings, as well as its distinctive mission and honor code. These pages suggest not only the many spiritual and intellectual opportunities for you here, but also the context in which you will study. Accomplished researchers and scholars will guide your efforts to observe more keenly, to contemplate more deeply, and to see more widely and insightfully than before. They will also assist you, finally, to express with clarity and grace what you have found. This is your challenge and your obligation.

A handwritten signature in black ink, reading "Merrill J. Bateman". The signature is written in a cursive style with a large, stylized 'M' and 'B'.

Merrill J. Bateman

BRIGHAM YOUNG UNIVERSITY

ADMINISTRATION

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<i>Assistant Student Life Vice President and Dean of Student Life</i>	Maren M. Mouritsen
<i>Assistant Student Life Vice President—Student Auxiliary Services</i>	Dean Fairbank

Brigham Young University is fully accredited by the Northwest Association of Schools and Colleges. In addition, many professional programs of the university are reviewed, evaluated, and accredited by national and state associations and boards.

For a complete listing of university officers, of organizations that have given full accreditation to related programs at the university, and of educational associations with which the university is affiliated, see the BYU Undergraduate Catalog.

MISSION OF BRIGHAM YOUNG UNIVERSITY

THE mission of Brigham Young University—founded, supported, and guided by The Church of Jesus Christ of Latter-day Saints—is to assist individuals in their quest for perfection and eternal life. That assistance should provide a period of intensive learning in a stimulating setting where a commitment to excellence is expected and the full realization of human potential is pursued.

All instruction, programs, and services at BYU, including a wide variety of extracurricular experiences, should make their own contribution toward the balanced development of the total person. Such a broadly prepared individual will not only be capable of meeting personal challenge and change but will also bring strength to others in the tasks of home and family life, social relationships, civic duty, and service to mankind.

To succeed in this mission the university must provide an environment enlightened by living prophets and sustained by those moral virtues which characterize the life and teachings of the Son of God. In that environment these four major educational goals should prevail:

- All students at BYU should be taught the truths of the gospel of Jesus Christ. Any education is inadequate which does not emphasize that His is the only name given under heaven whereby mankind can be saved. Certainly all relationships within the BYU community should reflect devout love of God and a loving, genuine concern for the welfare of our neighbor.
- Because the gospel encourages the pursuit of all truth, students at BYU should receive a broad university education. The arts, letters, and sciences provide the core of such an education, which will help students think clearly, communicate effectively, understand important ideas in their own cultural tradition as well as that of others, and establish clear standards of intellectual integrity.
- In addition to a strong general education, students should also receive instruction in the special fields of their choice. The university cannot provide programs in all possible areas of professional or vocational work, but in those it does provide the preparation must be excellent. Students who graduate from BYU should be capable of competing with the best in their fields.
- Scholarly research and creative endeavor among both faculty and students, including those in selected graduate programs of real consequence, are essential and will be encouraged.

In meeting these objectives BYU's faculty, staff, students, and administrators should also be anxious to make their service and scholarship available to The Church of Jesus Christ of Latter-day Saints in furthering its work worldwide. In an era of limited enrollments, BYU can continue to expand its influence both by encouraging programs that are central to the Church's purposes and by making its resources available to the Church when called upon to do so.

We believe the earnest pursuit of this institutional mission can have a strong effect on the course of higher education and will greatly enlarge Brigham Young University's influence in a world we wish to improve.

GRADUATE STUDY AT BRIGHAM YOUNG UNIVERSITY

Dean: Addie Fuhriman, Professor of Psychology,
B-380 ASB, PO Box 21341
Provo, UT 84602-1341
(801) 378-4465

A UNIVERSITY is a place where men and women of character meet minds and ideas that have shaped and will continue to shape human experience in significant ways. It is a place where people read and think and create and analyze, and where they give expression to ideas. It is a place of intellectual and moral broadening and deepening. It is a place where people contribute new knowledge and arrive at new levels of understanding.

Graduate study distinguishes itself by advanced systematic study and experience in depth—a depth in understanding, knowledge, and scholarly competence and in inquiry and discovery. Successful graduates are equipped to contribute to their disciplines, to teach and transmit knowledge within their disciplines, to conduct research and be creative, to apply their learning in the everyday world, and ultimately to extend service to their disciplines and to humanity. Building on the foundation of a strong baccalaureate education, graduate studies at BYU adds an expectation of significantly greater levels of competency. Through graduate study, students achieve mastery of a discipline by engaging its primary sources and comprehending its literature and methodologies. The graduate degree connotes that the graduate is not

only aware of but has acquired experience in academic and professional roles and responsibilities.

Graduate study at the university culminates in doctoral and master's degrees in a broad range of academic disciplines and professional fields. The doctoral degree requires the student to demonstrate a high level of scholarly competence, which includes the ability to conduct and report significant research in a highly effective way. Advanced systematic study in a discipline is also essential, and it is followed by comprehensive examinations that require students to integrate and understand the collective knowledge of their disciplines. A written dissertation resulting from independent research is scrutinized and tested in a concluding oral examination. The master's degree also includes advanced course work, demonstrated mastery on vital aspects of a discipline, skill in research methodology and theory, and preparation for future creative work. Nearly all master's programs involve integrating examinations and a major culminating piece of written work, usually a thesis, and an oral examination on that work.

Graduate study at Brigham Young University takes place within a learning environment characterized by rigorous programs of study, by selective admission of highly qualified students, and by a graduate faculty who are committed to excellence in teaching, scholarship and creative activity, and service.

CONSISTING of senior faculty members from a variety of disciplines, the Graduate Council is one of a number of councils with major responsibility for academic programs and standards across the campus. The Graduate Council is primarily responsible for establishing and maintaining standards of quality in graduate education at Brigham Young University. In discharging this responsibility, the council sets policy, conducts extensive reviews of graduate programs, evaluates proposals for new programs, and makes recommendations to the provost on a variety of issues affecting graduate education.

The goal of the council is to ensure that excellent graduate programs are offered and sustained at BYU.

Thus, the university is engaged in a continuing effort to consolidate resources behind strong programs and excellent graduate experiences.

Current 1995–96 members of the Graduate Council are: Bonnie Brinton, Educational Psychology; David Comer, Electrical Engineering; Marie Cornwall, Sociology; Kate Kirkham, Organizational Behavior; Tony Martinez, Computer Science; Dilworth Parkinson, Asian and Near Eastern Languages; Harrison Powley, Music; Cheryl Preston, Law; Ward Rhees, Zoology; Morris Robins, Chemistry and Biochemistry; Beverly Roeder, Animal Science; Elaine Sorensen, Nursing; Larry Tucker, Physical Education.

OFFICE OF GRADUATE STUDIES

ALTHOUGH departments and colleges carry the major responsibility for graduate programs at BYU, certain procedures are done centrally. The admissions process begins in the Office of Graduate Studies, B-356 ASB, PO Box 21341, Provo, UT 84602-1341, and progress toward a degree is recorded there. The office also maintains standards and requirements that apply uniformly across campus and serves as a clearinghouse for questions, problems, exceptions to policy, and requests for policy changes.

The office is staffed by advisors thoroughly familiar with policies and procedures at the general university level. It is in the student's home department, however, that the most important advising is done in regard to individual program requirements and procedures. It is essential that a student consult frequently with departmental advisors. In many instances department requirements exceed university minimums.

STANDARDS OF CONDUCT

THE Brigham Young University Honor Code as established by the university and the board of trustees for all students under its jurisdiction in institutions of higher learning appears in the Graduate Studies Application Form and the BYU Undergraduate Catalog. To know the substance and essence of that code is to know that Brigham Young University is unique among universities. Governed by principles basic to its sponsoring church, The Church of Jesus Christ of Latter-day Saints, it purposefully creates and nurtures an environment in which faith and intellect join together in the pursuit of truth.

All members of the Brigham Young University community—students, faculty, staff, and administrators—agree to live by the values of the gospel of Jesus Christ as found in the standard scriptural works of the Church and the teachings of Church leaders past and present. In essence, then, those who study and work here promise to live lives of kindness, honesty, chastity, virtue, and faithfulness. They promise to do good to their neighbors and to seek after whatever is “virtuous, lovely, or of good report or praiseworthy” (13th Article of Faith).

Such behavior is firmly rooted in eternal principles that have been cherished and articulated by the prophets and other wise men and women throughout the history of civilization. The great thinkers, writers, artists, statesmen, and scientists have taught the importance of life with honor. Beyond the profound thoughts of these men and women, however, are the sacred, inspired writings of God’s prophets. Although good principles can be found in the best of human creations, the ultimate power of these and all true principles is found in the gospel of Jesus Christ.

In practical terms, this means a high standard of conduct is expected of those who join the university community. As sons and daughters of God, all at BYU must strive to grow steadily in faith, intelligence, love, and integrity. All agree to follow the moral teachings of Jesus Christ and the living prophets, and to be honorable and compassionate in their dealings with others. All agree to observe in letter and spirit the principles of health contained in the

Word of Wisdom, specifically, to abstain from alcohol, tobacco, tea, and coffee, and from the abuse of drugs and other harmful substances. All agree to be honest in work and in human associations, never taking unfair advantage of others, never representing the work of others as their own, endeavoring to help others to reach their highest goals.

HONOR CODE

Students and faculty members at Brigham Young University have prepared the Honor Code, recognizing that it is a covenant between each person and all other members of the community, a covenant by which the community grants the privileges and opportunities of citizenship and each person within the community accepts two fundamental responsibilities: (1) to maintain personal integrity by living the code and (2) to maintain the integrity of the community by helping others live the code.

The successful functioning of the Honor Code, indeed of the university itself, depends on mutual confidence and trust among students, faculty members, and staff. Unless each is assured that the other will uphold the compact, the code will fail and the university will be diminished. Moreover, students and faculty members share a joint responsibility for hearing and evaluating reports of Honor Code infractions.

The university’s very being is at stake in this matter. Its certification that a person has completed a class, a course of study, or the requirements for a degree is without value if the person obtained that certification through dishonesty. Similarly, a faculty member’s name and university affiliation on the report of a piece of research must signify that the work and the report are honest. Examination papers, laboratory work, essays, theses, projects, research tools, and all other kinds of work for classes and degrees are to be prepared with no use having been made of unauthorized or undocumented materials of any kind. Students are not to give or receive aid in examinations or in class work where such is not permitted. Any individual violation of the Honor Code compromises every member of the community; therefore,

the entire community has a deep-rooted investment in the honesty of every person at BYU.

In essence, then, a scholarly publication, grade, certification, or diploma from Brigham Young University should and must have special and particular significance with regard to honor.

DRESS AND GROOMING STANDARDS

The attire and grooming of both men and women should always be modest, neat, clean, and appropriate. See the Graduate Studies Application and the BYU Undergraduate Catalog for a detailed description of specific requirements. Registration at BYU constitutes an affirmative consent to abide by these standards and to represent the university and its sponsoring church in a manner that is becoming and dignified.

CONTINUING ECCLESIASTICAL ENDORSEMENT

All undergraduate and graduate students planning to register the following fall for university credit, including thesis hours, internships, or off-campus programs, must have an annual Continuing Ecclesiastical Endorsement. LDS students may be endorsed **only** by the bishop of their ward of residence during

the winter semester. Non-LDS students receive the endorsement from a local ecclesiastical leader of their choice or from Student Life (380 SWKT, PO Box 25542, Provo, UT 84602-5542). The endorsement deadline is April 1 of each year, after which there will be a \$20 late fee. No student will be able to register for fall or subsequent semesters or terms without this new endorsement.

Requirements

All students must abide by the Honor Code, Residential Living Standards, and Dress and Grooming Standards. LDS students must fulfill their duty in The Church of Jesus Christ of Latter-day Saints, attend Church meetings, and abide by the rules and standards of the Church.

Withdrawn Ecclesiastical Endorsement

The Ecclesiastical Endorsement may be withdrawn at any time by a student's ecclesiastical leader. When an endorsement is withdrawn, the student will be required to discontinue enrollment at the university. The decision to withdraw an Ecclesiastical Endorsement may be appealed first to the responsible stake president. In the case of a decision adverse to the student at the stake president level, an appeal may be taken to the Honor Code Office.

UNIVERSITY LIBRARY

3080 HBLL, PO Box 26878
Provo, UT 84602-6878
(801) 378-2905

University Librarian: Sterling J. Albrecht
Deputy University Librarian: Randy J. Olsen
Assistant University Librarian: Susan Fales
Assistant University Librarian: K. Paul Jordan
Assistant University Librarian: Larry J. Ostler

HOUSING over three million volumes, including an extensive collection of pamphlets, journals, current serials, newspapers, microform titles, and nonprint materials, the Harold B. Lee Library is a major resource for graduate student research. It is a depository for United States and Canadian government documents and regularly receives publications of state and local governments. Some of the library's strengths include special research collections in music in the areas of film, radio, viola, and harp. Notable collections have also been established in early modern European history, Renaissance Reformation history, American Church history, western Americana, Mormon Americana, nineteenth-century British literature, and the history of astronomy. Although many volumes of these collections are found in open stacks, most of the special collections are located on the fourth of the library's five levels. The Archives and Manuscripts Division is on the fifth level.

BYU participates in several cooperative programs that allow students and faculty to use materials housed in other state institutions and major research libraries throughout the United States:

1. **Interlibrary loan services** (Kathleen Hansen, 3437 HBLL, PO Box 26881, Provo, UT 84602-6881, telephone (801) 378-6344) allow students to borrow books from other institutions. Photocopies of journal articles may be obtained for photocopying costs. A RUSH telefacsimile service is also available.
2. Through the **Utah College Library Council** arrangements have been made that allow students

with valid BYU ID cards to borrow materials from other college and university libraries in the state.

3. The **Research Libraries Group** is a national consortium of major research libraries that work together to improve access to library resources necessary in scholarly research. The benefits of membership in this group include priority treatment of interlibrary loan requests from many major U.S. libraries (e.g., Yale, Princeton, Stanford, University of Michigan) and the availability of some materials that normally do not circulate. This group also sponsors a computerized shared-cataloging system that provides access to the computerized portion of the card catalogs of member libraries. Inquiries are handled at the reference desk on the main floor (level 3, (801) 378-2927).
4. The **Center for Research Libraries** is an organization whose objective is to increase the availability of research materials to its more than 180 member institutions. Through this organization, many infrequently used materials are deposited in a common pool from which all members may borrow. BYU students may borrow from the center's collection of archives, dissertations, government documents, journals, monographs, and newspapers. Inquiries are handled at the Interlibrary Loan Office.
5. **BYU's Computer-Assisted Research Services**, through access to more than 200 computerized databases, provide bibliographic references on a given topic. There is a charge for computer connect time, but not for consultation services. Inquiries are handled in 3230 HBLL, PO Box 26800, Provo, UT 84602-6800, telephone (801) 378-5627.

The library also provides a number of special services for graduate students. For example, some study carrels are available by assignment to graduate students (doctoral students have priority), and graduate students may check out circulating books for eight weeks rather than two (the undergraduate limit). Furthermore, research personnel in the library, in

addition to reference desk staff, will work individually and in depth with graduate students on their research projects and theses.

The facilities of other libraries operated by The Church of Jesus Christ of Latter-day Saints are also available to Brigham Young University students. The Family History Library in Salt Lake City contains approximately 100,000 books and more than 800,000

rolls of microfilm. A regional family history library, operating under the general direction of the Church Family History Department, is located on the fourth level of the Harold B. Lee Library. The library of the Church Historical Department is also available by arrangement to advanced students for research. This facility is in the LDS Church Office Building in Salt Lake City.

UNIVERSITY GRADUATE STUDIES CALENDAR

Fall Semester 1996

Many departments have deadlines earlier than the general university deadlines listed below. Contact departments for specific deadlines.

- January 15, 1996 Departmental application deadlines for fall 1996 entry to graduate study may be as early as January 15. For specific program and department deadlines and requirements, refer to the department listing in this catalog or check with the department.
- April 1 Last day to submit Ecclesiastical Endorsement without a late fee
- June 1 Financial aid priority processing date for Federal Stafford Loans
- July 15 Last day to apply for BYU short-term loans from Financial Aid Office to pay fall semester 1996 tuition by payment deadline
- August 15 Tuition payment deadline for fall semester 1996 to avoid \$50 late fee (must be in BYU Cashiers' Office by this date)
- 26–28 Annual University Conference
- 30 Last day to pay tuition with \$50 late fee
- September 2 Labor Day holiday
- 3 Classes begin. Late tuition fee increased to \$90
- 3 In-person late registration for students who did not use the advance registration system
- 4 Last day to drop classes without a fee per class
- 16 Last day to late register or add classes. Classes dropped after this date will appear with W (official withdrawal) on the transcript.
- 16 Last day to pay tuition (with late fee)
- 20 Last day graduate students may apply for December 1996 graduation (graduation fee must be paid)

- October 7 Last day to drop a class for academic reasons and/or officially discontinue from the university without being graded

- November 8 Last day students in dissertation, thesis, or selected project programs may schedule a final oral examination (defense of their work) and submit one copy of their work to the Reserve Library for December 1996 graduation

- 15 Last day to apply for BYU short-term loans from Financial Aid Office to pay winter semester 1997 tuition by payment deadline

- 15 Full payment due on BYU short-term loans for fall semester 1996

- 22 Last day students in dissertation, thesis, or selected project programs may have a final oral examination (defense of their work) for December 1996 graduation

- 28–29 Thanksgiving Day holiday

- 26 Last day to officially withdraw from the university or drop classes for nonacademic emergencies

- December 7 Last day students may submit final copies of a dissertation, thesis, or selected project to the library copy center for binding for December 1996 graduation

- 14 Last day students may complete remaining requirements for a degree, pay fees, and submit examination results (oral or written) and grade changes for I's, T's, etc., to the Office of Graduate Studies for December 1996 graduation

- 11 Last day of class instruction

- 12–13 Reading days

- 14, 16–19 Final examinations

- 20 December graduation (no commencement exercises)

Winter Semester 1997

Many departments have deadlines earlier than the general university deadlines listed below. Contact departments for specific deadlines.

- January 15, 1996 Departmental application deadlines for winter 1997 entry to graduate study may be as early as January 15, 1996. For specific program and department deadlines and requirements, refer to the department listing in this catalog or check with the department.
- November 15 Last day to apply for BYU short-term loans from Financial Aid Office to pay winter semester 1997 tuition by payment deadline
- December 16 Tuition payment deadline for winter semester 1997 to avoid \$50 late fee (must be in BYU Cashiers' Office by this date)
- January 3, 1997 Last day to pay tuition with \$50 late fee
 - 6 Classes begin. Late tuition fee increased to \$90
 - 6 In-person late registration for students who did not use the advance registration system
 - 7 Last day to drop classes without a fee per class
 - 17 Last day to late register or add classes. Classes dropped after this date will appear with W (official withdrawal) on the transcript.
 - 17 Last day to pay tuition (with late fee)
 - 20 Martin Luther King Day holiday
 - 24 Last day graduate students may apply for April 1997 graduation (graduation fee must be paid)
- February 10 Last day to drop a class for academic reasons and/or officially discontinue from the university without being graded
 - 17 Presidents' Day holiday
 - 18 Monday class instruction.
No Tuesday classes

- 28 Last day students in dissertation, thesis, or selected project programs may schedule a final oral examination (defense of their work) and submit one copy of their work to the Reserve Library for April 1997 graduation
- March 14 Last day students in dissertation, thesis, or selected project programs may have a final oral examination (defense of their work) for April 1997 graduation
- 15 Full payment due on BYU short-term loans for winter semester 1997
- 21 Last day students may submit final copies of a dissertation, thesis, or selected project to the library copy center for binding for April 1997 graduation
- 28 Last day students may complete remaining requirements for a degree, pay fees, and submit examination results (oral or written) and grade changes for I's, T's, etc., to the Office of Graduate Studies for April 1997 graduation
- April 1 Last day to submit Ecclesiastical Endorsement without a late fee
- April 2 Last day to officially withdraw from the university or drop classes for nonacademic emergencies
- 15 Last day of class instruction
- 16–17 Reading days
- 18, 19, 21–23 Final examinations
- 24 Graduation—university commencement
- 25 Graduation—college convocations

Spring Term 1997

Many departments have deadlines earlier than the general university deadlines listed below. Contact departments for specific deadlines.

- September 15, 1996 Departmental application deadlines for spring 1997 entry to graduate study may be as early as September 15, 1996. For specific program and department deadlines and requirements, refer to the department listing in this catalog or check with the department.

- March 1 Last day to apply for BYU short-term loans from Financial Aid Office to pay spring term 1997 tuition by payment deadline
- April 1 Last day to submit Ecclesiastical Endorsement without a late fee
- 23 Tuition payment deadline for spring term 1997 to avoid \$25 late fee (must be in BYU Cashiers' Office by this date)
- 30 Classes begin
- 30 In-person late registration for students who did not use the advance registration system
- May 1 Last day to drop classes without a fee per class
- 7 Last day to late register or add classes. Classes dropped after this date will appear with W (official withdrawal) on the transcript.
- 7 Last day to pay tuition (with late fee)
- 16 Last day to drop a class for academic reasons and/or officially discontinue from the university without being graded
- 23 Last day graduate students may apply for August 1997 graduation (graduation fee must be paid)
- 26 Memorial Day holiday
- June 5 Last day to officially withdraw from the university or drop classes for nonacademic emergencies
- 17 Last day of class instruction
- 18 Reading day
- 19-20 Final examinations
- 20 Last day students in dissertation, thesis, or selected project programs may schedule a final oral examination (defense of their work) and submit one copy of their work to the Reserve Library for August 1997 graduation

Summer Term 1997

Many departments have deadlines earlier than the general university deadlines listed below. Contact departments for specific deadlines.

- September 15, 1996 Departmental application deadlines for summer 1997 entry to graduate study may be as early as September 15, 1996. For specific program and department deadlines and requirements, refer to the department listing in this catalog or check with the department.
- April 1, 1997 Last day to submit Ecclesiastical Endorsement without a late fee
- May 1 Last day to apply for BYU short-term loans from Financial Aid Office to pay summer term 1997 tuition by payment deadline
- 23 Last day graduate students may apply for August 1997 graduation (graduation fee must be paid)
- June 16 Tuition payment deadline for summer term 1997 to avoid \$25 late fee (must be in BYU Cashiers' Office by this date)
- 20 Last day students in dissertation, thesis, or selected project programs may schedule a final oral examination (defense of their work) and submit one copy of their work to the Reserve Library for August 1997 graduation
- 23 Classes begin
- 23 In-person late registration for students who did not use the advance registration system
- 24 Last day to drop classes without a fee per class
- 30 Last day to late register or add classes. Classes dropped after this date will appear with W (official withdrawal) on the transcript.
- 30 Last day to pay tuition (with late fee)
- July 3 Last day students in dissertation, thesis, or selected project programs may have a final oral examination (defense of their work) for August 1997 graduation
- 4 Independence Day holiday

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| 10 Last day to drop a class for academic reasons and/or officially discontinue from the university without being graded | 24 Pioneer Day holiday |
| 11 Last day students may submit final copies of a dissertation, thesis, or selected project to the library copy center for binding for August 1997 graduation | 30 Last day to officially withdraw from the university or drop classes for nonacademic emergencies |
| 18 Last day students may complete remaining requirements for a degree, pay fees, and submit examination results (oral or written) and grade changes for I's, T's, etc., to the Office of Graduate Studies for August 1997 graduation | August 11 Last day of class instruction |
| | 12 Reading day |
| | 13–14 Final examinations |
| | 14 Graduation—university commencement |
| | 15 Graduation—college convocations |

GENERAL INFORMATION

TUITION AND FEES

Cashiers' Office
D-155 ASB, PO Box 21128
Provo, UT 84602-1128
(801) 378-7808

All students who register at BYU must pay full tuition and fees (in U.S. dollars) at the time of registration. Fees are to be paid at the Cashiers' Office, but questions regarding fee assessment should be addressed to Financial Services (D-148 ASB). The university reserves the right to change tuition and fees without notice.

Because students beyond the baccalaureate degree typically make a heavier demand on university resources than undergraduate students do, they are assessed at a higher tuition rate.

Full-Time and Part-Time Tuition Assessment

Students assessed full-time tuition pay a fixed rate of tuition; students assessed part-time tuition pay for the number of credit hours taken.

Full-time: 8.5 or more hours in a semester
4.5 or more hours in a term

Part-time: Fewer than 8.5 hours in a semester
Fewer than 4.5 hours in a term

Note: A fraction of an hour is counted as a full hour for assessing fees.

Audited Courses

The charge for auditing a course (attending class but not receiving a grade or credit) is the same as for taking the course for credit. Audited courses do not appear on the transcript.

Tuition

A significant portion of the cost of operating the university is paid from the tithes of The Church of Jesus Christ of Latter-day Saints. Therefore, students and families of students who are tithe-paying members of the Church have already made a contribution to the operation of the university. Because others have not so contributed, they are charged a higher rate of tuition. This practice is similar in principle to that of

state universities that generally charge nonresidents at a higher rate than residents.

Refunds

Students who officially discontinue from the university may receive a partial refund of tuition or fees. Details concerning discontinuance procedures and refund schedules are printed in the current class schedule.

1996–97 Tuition Schedule

Per Semester (Fall or winter)		Per Term (Spring or summer)	
LDS	Non-LDS	LDS	Non-LDS

Graduate Students (other than students in the Law School and Graduate School of Management)

Full-Time			
\$1,490	\$2,235	\$745	\$1,117
Part-Time			
\$165	\$248	\$165	\$248
per hour	per hour	per hour	per hour

Graduate School of Management and Law School Students

Full-Time			
\$2,380	\$3,570	\$1,190	\$1,785
Part-Time			
\$264	\$396	\$264	\$396
per hour	per hour	per hour	per hour

Fees

Late Tuition Payment Fee

Full-time and part-time students who pay tuition after the tuition payment deadlines (see current class schedule) for a semester or a term are assessed the following late fees:

Semesters:

Before the semester begins	\$50
After the semester begins	\$90

Terms:

Before or after the term begins	\$25
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Students whose tuition check is not honored by the bank will be charged the late fee in effect at the time the check is redeemed.

Class Fees

Some courses require a fee in addition to tuition, to be paid upon registration. See course listings.

Miscellaneous General Fees

The university assesses fees for a variety of services. The following apply specifically to graduate education:

Application fee (nonrefundable)

New applying student	\$30
Reapplying student	\$30

Graduation fee (nonrefundable)

Master's degree	\$20
Doctoral degree	\$25

Graduate minimum registration fee

(for graduate students using university facilities without formal registration for university classes)

LDS	\$330
Non-LDS	\$496

Microfilming of dissertation

(doctoral students only)	\$50*
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Special examination fee

Nonrefundable fee for each course challenged . .	\$20
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Thesis binding (four copies)	\$44*
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*Subject to change without notification.

ADMISSIONS

Office of Graduate Studies
B-356 ASB, PO Box 21339
Provo, UT 84602-1339
(801) 378-4091

Applications for admission to graduate study are available from the Office of Graduate Studies. The Law School (340 JRCB, PO Box 28000, Provo, UT 84602-8000, telephone (801) 378-4277) and the Graduate School of Management (730 TNRB, PO Box 23113, Provo, UT 84602-3113, telephone (801) 378-4123) use different forms, which they furnish upon request.

Deadlines for Graduate Applications

Application deadlines vary by department and program and are listed in the catalog under the department sections. All parts of the application (including test scores, letters of recommendations, transcripts, and any additional materials required by the department) must be received by the Office of Graduate Studies on or before the published deadline. Many programs recommend submitting complete applications at least 30 days before their published application deadlines.

Application Requirements

Admission to graduate study is highly selective and is granted to a specific program for a specific semester or term. As a minimum, applicants who wish to be considered for admission must do the following:

1. Submit a *complete* application *before* the application deadline. An application is not considered complete until the application fee has been paid and all official transcripts, letters of recommendation (Part C), the statement of intent, and the confidential report (Part B) are in, as well as Parts A and D of the admissions application.
2. Agree to maintain university standards of personal conduct.
3. Receive a baccalaureate degree from an accredited U.S. or Canadian university before the expected semester of entry. The Office of Graduate Studies must receive an official transcript showing that the degree has been conferred. Without such verification, registration will not be permitted beyond the first semester.

4. Have earned at least a 3.0 GPA (on a 4.0 scale) in the last 60 semester hours of course work.
5. Satisfy departmental requirements for consideration, including national examinations (such as the GRE) specified by the department.

Note: Students applying concurrently to more than one program must complete a separate application for each program and pay a separate fee for each application, but they need submit only one Honor Code Commitment and Confidential Report (Part B).

International Applicants (all non-U.S.)

In addition to the requirements described above, international applicants must do the following:

1. Submit a TOEFL score of at least 550 (some departments require a higher minimum score). This is required of all applicants for whom English is not the native language. Students with a bachelor's degree from a U.S. or Canadian university are exempt from this requirement.
2. Submit a completed Financial Certification form (I-1), with supporting documents. Applicants must provide proof of sufficient funds for the total length of their program of study.
3. Submit an official transcript from each institution attended, with accompanying official English translation.
4. Submit an official copy of a degree certificate showing completion of a program at least equivalent to a U.S. bachelor's degree, with accompanying official English translation.

Note: Brigham Young University will not process applications from applicants entering the United States with a "B" or tourist visa.

Full Disclosure Requirement

All information and documents required for admission must be submitted, including transcripts from every institution attended. Incomplete information or falsification of information constitutes grounds for immediate dismissal and loss of all credit earned at BYU. Once the university receives application materials, those materials become the property of the university and are kept in the strictest confidence as required by university policy. Once the parts of an application have been received, materials will not be returned to an applicant.

Admissions Process

The Office of Graduate Studies receives and checks all parts of the application for completeness. Information for the department (Part D), the statement of intent, one copy of the official transcripts, letters of recommendation, and other departmental requirements are forwarded to the department; other parts of the application are retained in the Office of Graduate Studies. When the application is complete (an application from an international applicant must also include the TOEFL score and financial clearance to be complete), the Office of Graduate Studies clears the applicant for the department's consideration and asks for the department's recommendation.

Notice of Acceptance or Denial

After the admissions file has been reviewed for final acceptance by the department and the Office of Graduate Studies, the university notifies applicants of the admissions decision. Only a letter from the Office of Graduate Studies grants official university acceptance. International applicants receive an I-20 form or IAP-66 (Certificate of Eligibility) with their official acceptance letter; the I-20 and IAP-66 are used to obtain a student visa (F-1 or J-1).

Newly admitted international students are required to attend an orientation meeting at the beginning of their first semester. Details are available at International Services (350 SWKT, PO Box 25520, Provo, UT 84602-5520, telephone [801] 378-2695).

Non-Degree-Seeking Applicants

Students interested in registering at BYU on a non-degree-seeking basis are restricted to spring and summer term registration because of enrollment constraints during fall and winter semesters. Questions about non-degree-seeking applications should be referred to an admissions counselor in the BYU Admissions Office (A-183 ASB, PO Box 21110, Provo, UT 84602-1110, telephone [801] 378-2500).

REGISTRATION

B-130 ASB, PO Box 21114
Provo, UT 84602-1114
(801) 378-2824

Eligibility

Upon receipt of an official letter of acceptance from the Office of Graduate Studies, new graduate students are eligible to register. Continuing graduate students are eligible if they have fulfilled the minimum registration requirement (6 hours per year) in the preceding academic year.

Registration Materials

The current class schedule bulletin contains complete registration instructions, deadlines, and a list of all classes offered, including times, instructors, and locations. It is mailed to all new students with U.S. or Canadian mailing addresses. Continuing students may purchase one at the BYU Bookstore or the Registration Office. International students may obtain class schedule bulletins and register when they arrive on campus.

Registration Process

The current class schedule contains a complete description of the registration process. What follows is a brief summary of that process:

Brigham Young University allows students to register by Touch-tone telephone or by using Academic Information Management (AIM) computer terminals (located in advisement centers and various campus locations). For fall and winter semesters, the process begins when the Registration Office mails a Registration Notice to all eligible students. This form indicates the time the student can begin to register, allows for a change of address, and shows any prior balance due that must be paid before registration is possible. Beginning registration times are assigned on a priority basis with graduate students given the first priority. Registration for fall begins in April, for winter semester in October, and for spring and summer terms in February. With the Touch-tone system and AIM terminals, students can register and make registration changes until classes begin.

A Tuition Billing Statement with a listing of classes is mailed three weeks prior to the tuition deadline to each student registered for at least one

class. Students who fail to pay tuition by August 15 for fall semester, December 15 for winter semester, and mid-April and mid-June for spring and summer terms will be assessed late tuition fees.

Once a student registers for classes, that student is officially enrolled and committed to attend. A student who then decides not to come must drop all classes. Prior to the first day of school, classes may be dropped using the discontinuance action code on the Touch-tone telephone registration system. Once school begins, students should contact the Discontinuance Office in B-150 ASB, PO Box 21114, Provo, UT 84602-1114, or telephone (801) 378-7705. Classes that are not dropped will remain on the student's record and be charged tuition. Tuition will be charged starting the first day of class to the date of discontinuance at the percentage rate listed in the current class schedule.

Changes in Registration

Students may add or drop classes twenty-four hours a day by Touch-tone telephone or AIM terminal until classes begin. After the semester or term has started, however, each academic department determines how classes are added in that department. Final dates, fees, and instructions for adding and dropping classes are printed in the current class schedule.

Auditing Classes

U.S. students who wish to audit classes (attend but not receive credit) may add such classes on a space-available basis with instructor approval during the first ten class days of a semester (six days of a term). International students may not audit classes. Audited classes do not appear on the transcript, will not be considered in calculating enrollment verifications, will not fulfill the minimum registration requirement, and do not apply toward a graduate degree. In addition, audited courses may not be paid for by graduate scholarship funds.

Registration Requirements

First Semester

Because acceptance is granted for a specific semester, students are required to register for at least 2 hours in the semester for which acceptance has been granted, or the acceptance is forfeit. New students who do not enroll the semester or term for which they are accepted and who wish to enroll in a subsequent semester

must inform the Office of Graduate Studies immediately. Acceptance in one semester or term does not guarantee acceptance in a subsequent semester or term.

Minimum Registration Requirement

U.S. Students, Semester or Term. U.S. graduate students are required to register for at least 2 credit hours during any semester or term in which they use any university facilities, consult with faculty, or take any comprehensive or oral examinations. The number of graduate credit hours for which they register must, in the judgment of the faculty advisor, accurately reflect the student's involvement in graduate study and use of university resources such as libraries, laboratories, and computer facilities. In no case will the registration be for fewer than 2 credit hours per semester.

U.S. Students, Academic Year. To retain active status and to qualify for subsequent registration, graduate students *must register for at least 6 semester hours each school year* and receive acceptable grades (no D, E, UW, NS, or I grades are allowed, nor are audits or correspondence courses). Students who do not fulfill this yearly requirement are dropped from their graduate programs; they lose their graduate status and must apply for readmission if they wish to continue.

International Students. International students must register for at least 9 semester hours each fall and each winter semester to fulfill U.S. Immigration and Naturalization Service requirements. Questions should be directed to International Services (350 SWKT, PO Box 25520, Provo, UT 84602-5520, telephone [801] 378-2695).

Readmission

Former graduate students who were dropped for failure to meet the minimum registration requirement, and who wish to resume their graduate studies, must submit an Application to Resume Graduate Study (available from the Office of Graduate Studies), pay a \$30 nonrefundable processing fee, and submit a Re-application Honor Code Commitment Form. International students will also need to submit a new Financial Certification Form. Students should expect their previous course work to be reevaluated and their degree requirements to reflect current expectations of the program.

Loss of Eligibility to Register

Once enrolled, a graduate student becomes ineligible to register for subsequent semesters if:

1. The student has not fulfilled the minimum registration requirement (6 hours per year), has withdrawn from the graduate program, or has had his or her graduate degree program terminated by the department.
2. The student has not submitted a study list by the third week of the second semester after admission.
3. The Office of Graduate Studies has not received official transcripts showing that the required prerequisite degrees have been conferred.
4. The student has violated the BYU Honor Code and is not cleared by the Honor Code Office.
5. The student has failed to submit an annual continuing ecclesiastical endorsement.

Financial Aid Registration Requirements

It is the student's responsibility to comply with any registration requirements established by sponsoring agents for student loans, loan payment deferrals, assistantships, internships, scholarships, and awards.

Graduate Assistants, Interns, and Award

Recipients. Graduate students receiving assistantships, awards, or internships through BYU must register for at least 2 hours per semester or for 1 hour per term. Departmental requirements may exceed these minimums, and international students must register for at least 9 semester hours each fall and winter semester.

BYU Short-Term Loans. Only degree-seeking students enrolled in day school are eligible for short-term BYU tuition loans. Since the amount borrowed is directly applied toward the cost of tuition, no minimum level of enrollment is required.

Federal Loans (Stafford Loans and Supplemental Student Loans). To qualify for federal loans, graduate students must normally register for at least 4.5 hours each semester or 2.5 hours each term. However, the regulations require that students who have used their six-month "grace" period but wish to defer payment on a previous federal loan must be registered full-time—8.5 or more hours per semester and 4.5 or more hours per term. Independent study, audit, or workshop classes cannot be used to meet the minimum hour requirement.

Verification of Enrollment Status

A student who is enrolled for 8.5 or more credit hours a semester or 4.5 credit hours or more for a term is considered full-time for tuition purposes. International students and students receiving financial assistance may be required to register for more hours to be considered a full-time student. A student enrolled for 4.5 to 8 credit hours a semester or 2.5 to 4 credit hours a term is considered a half-time student. Graduate students may request verification of their enrollment status from the Records Office, B-150, ASB, PO Box 21114, Provo, UT 84602-1114, telephone (801) 378-2631.

Master's and doctoral students who are enrolled for fewer than 8.5 credit hours per semester can petition for full-time status. To be considered for an exception a student must:

1. Have completed all required course work and have only the thesis or dissertation to complete, or be limited to less than full-time enrollment because of a required teaching assistantship, research assistantship, or internship. (The combination of TA/RA assignment and registration must be equivalent to a full-time load, e.g. half-time assistantship plus 6 credit hours of registration per semester.)
2. Be enrolled for at least 2 credit hours per semester or 1 credit hour per term.
3. Be certified by his or her department as being engaged full-time (40 hours or more per week) in pursuit of a degree.

Requests for such an exception should be directed to the Office of Graduate Studies.

Withdrawal or Discontinuance

Students who wish to withdraw from the university must initiate that process at the Discontinuance Office, B-150 ASB, PO Box 21114, Provo, UT 84602-1114, telephone (801) 378-7705.

ADVISEMENT

Academic Sponsor

Once accepted into a graduate program, students are assigned a department sponsor, often the department graduate coordinator, who guides their first registration and individual study until the student's graduate committee is appointed in the *first semester*.

Graduate Committees

Master's (thesis and nonthesis) committees will consist of, at the minimum, three members; doctoral committees, five members. The members of both master's and doctoral committees must be graduate faculty. In those cases when a student declares a minor, one member of the committee must be from the minor department. Departments may have additional members; nevertheless, they are intended to be *permanent* members of the student's committee.

All committee members share in the responsibility for advising and directing the student concerning course work, degree requirements, and research (thesis and dissertation) and creative work. For example, all will participate in such events as prospectus meetings, comprehensive exams, and thesis/dissertation defenses and will be responsible for the evaluation of the student's performance. The individual contribution of committee members may vary by kind, effort, and intensity. Committee formation should occur *no later* than at the time of submission of the student's program of study.

Program of Study

The program of study is a carefully considered outline that helps students fulfill all degree requirements. Master's students should complete the program of study under the direction of their graduate committee during the student's first semester, and in no case later than the third week of the second semester. Doctoral students should receive approval and submit their program of study during the first year, and in no case later than the third week of the beginning of the second year of study. Students without a program of study recorded with the Office of Graduate Studies will not be able to register for subsequent semesters. Necessary changes in a student's program or committee can be made if authorized by the student's committee and department graduate coordinator.

Progress Reports

Three times a year (during the first month of fall and winter semesters and spring term) each graduate student is sent a computer-generated progress report that compares the individual program of study with the courses taken and summarizes the student's progress in a program: classes completed, current registration, classes still needed, and grade point average.

In addition, the progress report alerts a student to possible problems with academic status, GPA, prerequisite degrees needed, minimum registration requirements, time limits, and courses.

DEGREE REQUIREMENTS

The following minimum standards for graduate programs have been established by the university, though it is not uncommon for departments to have higher standards. Additional information about specific requirements for each graduate program appears under individual department listings in this catalog. Furthermore, most departments publish detailed information about their program requirements that is available from department offices on request. Students should consult frequently with department graduate coordinators and committee chairs.

Doctor of Philosophy Degree

Admission Requirements

An applicant seeking admission to a program leading to the doctor of philosophy degree must meet the requirements outlined in the Admissions and departmental sections of this catalog. Prospective students should consult with individual departments for specific requirements.

Course Work Requirements

Graduate committees or program advisors, appointed following admission to a graduate program, will help students prepare their programs of study. The following credit requirements must be met:

1. *Credit Hours.* The minimum required for students with no master's degree is 54 semester hours beyond the baccalaureate degree; but the 54 hours may not include undergraduate (100 to 400 level) or other courses needed to fulfill prerequisite and skill requirements, or more than 18 hours of dissertation credit. Students who have earned a master's degree must complete at least 36 semester hours of additional graduate work at BYU beyond the master's degree. So long as these restrictions are met, students may, with the approval of their graduate committee, apply up to 36 hours of a master's program toward a doctoral degree. See the Credit Policies section of this catalog for

information about credits that may not apply toward a graduate degree.

2. *Minor.* If a minor is required as part of a doctoral degree, a student must:
 - a. Obtain the approval of the department chair of the major and the minor departments.
 - b. Select a graduate faculty member from the minor department (approved by the department chair of the minor department) to serve as a graduate committee member.
 - c. Register for and complete 12 semester hours of approved graduate credit in the minor.
 - d. Pass an oral or a written comprehensive examination in the minor field (prepared by the minor committee member).
3. *Dissertation Credit.* A student seeking a doctor of philosophy degree must register for and complete a minimum of 18 hours of dissertation credit. No more than 18 hours may count toward the 54 hours required, and all 18 hours may not be taken in one term or semester. Registration for dissertation credit and work on the dissertation must be concurrent.

Time Limit

A doctoral degree must be completed within eight years of the first semester of enrollment. See the Credit Policies section of this catalog for more detailed information about outdated credits and the time limit.

Residency

Doctor of philosophy students must register for at least two consecutive 6-hour semesters on the BYU campus.

Comprehensive Examination

Doctoral students must pass a written comprehensive examination in their field under the direction of the major department. This examination is normally given when the student has completed the required course work for the doctoral degree. Some departments also require an oral portion of the comprehensive examination. In the case of a declared minor, it is expected that the examination will include subject matter from the minor field. A student is advanced to degree candidacy only after successful completion of the comprehensive examination.

Oral Defense of Dissertations

The final oral examination (defense of the dissertation) must be scheduled with the Office of Graduate Studies *at least two* weeks in advance. Final examinations may not be held during the interim periods between semesters. All members of the BYU academic community are invited to attend the final oral examination, but only members of the student's graduate committee may question the candidate and vote on the candidate's performance.

A copy of the candidate's dissertation must be placed in the Reserve Library (3114 HBLL, PO Box 26817, Provo, UT 84602-6817, telephone [801] 378-2947) at least two weeks in advance of the oral examination so that interested faculty and students may review it before the examination.

Examination Results

The committee may vote to "pass," to "pass with qualification," to "recess," or to "fail" the student.

If the decision is to pass with qualification, the committee may require minor revisions of the dissertation, strengthening of the candidate's preparation in subject matter areas, or both. When these qualifications are cleared and the committee chair has properly recorded the clearance with the Office of Graduate Studies, the student is judged to have passed the examination.

If *two or more* examiners vote to recess, the examination is recessed. This permits the candidate to reschedule (with the department and the Office of Graduate Studies) a second and final examination. The new examination cannot be held sooner than a month after the recessed examination. In addition, the second examination must be convened with the original committee.

If *two or more* examiners vote to fail, the examination is failed and the graduate degree program of the student is terminated.

Doctor of Education Degree

Requirements for the doctor of education degree are in many ways the same as for the doctor of philosophy degree described in the preceding section. Differences in the two programs are as follows:

Differences in Admission Requirements

In addition to the requirements included in the Admissions section of this catalog, an applicant seeking admission to a doctor of education program must

either be certified as a teacher or have completed 22 semester hours of approved courses. Further, an applicant must have completed two years of successful professional experience. Prospective students should consult with individual departments for specific requirements.

Differences in Course Work Requirements

1. *Credit Hours.* EdD degrees require more hours than the minimums described for PhD programs.
2. *Dissertation Credit.* A student seeking a doctor of education degree must register for and complete a minimum of 12 hours of dissertation credit. No more than 12 hours may count toward the minimum hours required, and the 12 hours may not all be taken in one term or semester. Registration for dissertation credit and work on the dissertation must be concurrent.

Difference in Residency

Doctor of education students must also register for at least two consecutive 6-hour semesters on the BYU campus. However, in selected programs students may fulfill the residency requirements by registering for three consecutive full-time summer terms.

Master's Degree

Admission Requirements

An applicant seeking admission to a master's degree program must meet the requirements outlined in the Admissions section and the department section of this catalog. Prospective students should consult with individual departments for specific requirements.

Course Work Requirements

Graduate committees or program advisors, appointed following admission to a graduate program, will help students prepare their programs of study. The following credit requirements must be met:

1. *Credit Hours.* A student seeking the master's degree must complete a total of at least 30 semester hours of credit (excluding prerequisite courses). See the Credit Policies section of this catalog for information about credits that may not apply toward a graduate degree.
2. *Minor.* If a minor is required as part of a master's degree, a student must:
 - a. Obtain the approval of the department chair of the major and the minor departments.

- b. Select a graduate faculty member (approved by the department chair of the minor department) to serve as a committee member.
 - c. Register for and complete 9 semester hours of approved graduate credit in the minor.
 - d. Pass an oral or a written comprehensive examination in the minor field (prepared by the minor committee member).
3. *Thesis Credit or Project Credit.* Students in thesis programs must register for and complete a minimum of 6 hours of thesis credit. No more than 6 hours of thesis credit may count as part of the 30-hour minimum. Registration for thesis credit (from 1 to 6 hours per semester approved by the graduate committee chair) and work on the thesis must be concurrent. For students in a project program, at least 2 project credit hours are required.

Time Limit

All master's degrees must be completed within five years of the first semester of enrollment. See the Credit Policies section of this catalog for more detailed information about outdated credits and the time limit.

Full-Time Registration Requirement

In a few approved integrated master's programs, students may earn their baccalaureate and graduate degrees concurrently. Students in such integrated programs must pay graduate tuition for two full-time semesters.

Comprehensive Examination

Many master's programs require comprehensive examinations, which in combination with the defense of the thesis are the culminating experience of the master's degree.

Oral Defense of Theses or Selected Projects

The final oral examination (defense of thesis or selected project) must be scheduled with the Office of Graduate Studies *at least* two weeks in advance. Final examinations may not be held during the interim periods between semesters. All members of the BYU academic community are invited to attend the final oral examination, but only members of the student's graduate committee may question the candidate and vote on the candidate's performance.

A copy of the candidate's thesis or project must be placed in the Reserve Library (3114 HBLL, PO Box

26817, Provo, UT 84602-6817, telephone [801] 378-2947) at least two weeks in advance of the oral examination so that interested faculty and students may review it before the examination.

Examination Results

The committee may vote to "pass," to "pass with qualification," to "recess," or to "fail" the student.

If the decision is to pass with qualification, the committee may require minor revisions of the thesis or selected project, strengthening of the candidate's preparation in subject matter areas, or both. When these qualifications are cleared and the committee chair has properly recorded the clearance with the Office of Graduate Studies, the student is judged to have passed the examination.

If *two or more* examiners vote to recess, the examination is recessed. This permits the candidate to reschedule (with the department and the Office of Graduate Studies) a second and final examination. The new examination cannot be held sooner than a month after the recessed examination. In addition, the second examination must be convened with the original committee.

If *two or more* examiners vote to fail, the examination is failed and the graduate degree program of the student is terminated.

CREDIT POLICIES

Appropriate Credit Enrollment

Because graduate study is more rigorous than undergraduate study, a student should not register for more than 12 hours in a semester or 6 hours in a term. In many programs, even that may be too much. Furthermore, registration for thesis and dissertation credit and work on the thesis and dissertation should be concurrent and reasonable. It would be inappropriate, for example, for a student to register for all 18 dissertation credit hours in one semester or term. Students should consult with their committee chair in determining an appropriate and reasonable credit enrollment.

Restrictions on Credits That May Apply Toward a Graduate Degree

Nondegree, Senior, and Transfer Credit

Nondegree, senior and transfer credit, singly or combined, cannot exceed 10 semester hours of a graduate degree program.

Nondegree Credit. Credit taken after the baccalaureate degree has been received, but before the semester of formal admission to a graduate program, is defined as nondegree credit. Only with department approval can any such credit be considered as part of a graduate degree program.

Senior Credit. In some restricted instances students seeking a master's degree may apply credit taken during the senior year at BYU toward that degree, but in no instances can this credit apply to both a baccalaureate and a graduate degree.

Transfer Credit. Credit taken at other accredited universities in the United States or in Canada may, with department approval, count toward a graduate degree at BYU if the following conditions are met:

1. Any course to be transferred must be clearly graduate level.
2. The grade for any such course must be B or better (pass/fail courses are not transferable).
3. Home study, correspondence, and extension courses are not transferable.
4. Transfer credit in combination with nondegree and senior credit cannot total more than 10 hours.
5. Credit cannot have applied to another degree.

Credit from foreign universities can be considered for transfer only if certified by special examination (see the Credits Certified by Special Examination section that follows for details).

Other BYU Credit

Lower-division courses (100 and 200 level), Independent Study (correspondence) courses, 300- and 400-level religion courses, and education courses numbered 514R *cannot* apply toward a graduate degree.

No undergraduate courses may apply toward a doctoral degree (except those already applied to a master's degree).

Credits Certified by Special Examination

In rare circumstances, and with the approval of the department and the graduate dean, up to 10 credits may be certified by special examination. For example,

1. A student may wish to transfer normally disallowed graduate credit from a nonaccredited institution or from a foreign university.
2. A student may wish to challenge a course on the study list that covers material already mastered.

Applications to take special examinations may be obtained from the Office of Graduate Studies. For information about special examination fees, see the Tuition and Fees section of this catalog.

Outdated Credit and Time Limits

Only credit taken within the time limit for each degree may count toward the degree (eight years for doctoral degrees and five years for master's degrees). Petitions to extend time limits and count outdated credit are governed by the following:

1. Departments and colleges may petition for up to a one-year extension by providing reasonable evidence that extenuating circumstances caused an unavoidable delay in the student's progress toward a degree.
2. Departments and colleges may petition to allow credit outdated by more than one year but no more than five years to apply toward a degree, but the petition must be accompanied by impressive documentation that the credit in question has been updated by courses retaken, by special readings courses in the subjects outdated, or by examinations in each of the courses.
3. No credit outdated by more than five years may apply to a current degree, regardless of circumstances.

ACADEMIC STANDARDS

Grade Point Average (GPA) Requirements

Graduate students whose graduate (program of study) GPA falls below 3.0 (prerequisite and skill courses are exempted) will not be allowed to graduate and may be dismissed from their graduate programs. Students whose grades frequently fall in the C range or below should consult with their committees about the advisability of continuing graduate study. No D credit may apply toward a graduate degree.

Annual Reviews of Graduate Students

Departments are asked to evaluate the performance of graduate students *at least once a year*; some evaluate

more frequently. Students granted provisional admission should expect a review as early as the end of the first semester.

Each department establishes its own evaluation criteria and the standards it requires of graduate students, but generally students can expect to be evaluated on their total academic performance, their fulfillment of program requirements (program of study submitted, courses completed on schedule, prospectus approved by the department, student advanced to candidacy), and their professional performance (including quality of teaching and research). Copies of departmental evaluation criteria are available from individual departments.

Departments rate student performance as satisfactory, marginal, or unsatisfactory, indicating the reasons for a low rating, and inviting the student to respond to the evaluation or to comply with a set of stated conditions for remaining in the program.

Termination of Graduate Status

Termination of graduate status may result if a student:

1. Fails to fulfill the university's minimum registration requirement.
2. Makes a request to withdraw (with the intent to pursue a degree at another university, for personal reasons, or in response to department recommendation).
3. Fails to satisfactorily complete the conditions of acceptance.
4. Receives a marginal or unsatisfactory rating in a periodic review by the academic department and is unable or unwilling to comply with conditions for continuance outlined by the department.
5. Fails to make what the department or the university deems to be satisfactory progress toward a graduate degree.
6. Fails the departmental comprehensive examination.
7. Fails the final oral examination (defense of dissertation, thesis, or selected project).
8. Violates the university's standards of conduct or Honor Code.
9. Exceeds the time limit (five years for master's, eight years for doctoral).

Appeal of Termination

A student dismissed or facing dismissal may respond to or appeal that termination or impending termination. Such responses or appeals should be directed, in writing, to the department chair. A student who

wishes further consideration may appeal to the college dean. Ultimately, a final appeal may be made to the university graduate dean who, if circumstances warrant it, may appoint a committee of impartial faculty members to adjudicate the matter.

Student Academic Grievances

The university has an established procedure for handling student academic grievances. If consulting with the teacher or the graduate committee chair does not resolve a grievance, a graduate student should describe the problem to the department graduate coordinator and/or the department chair. If difficulties persist, the student may ask the college dean and finally the graduate dean for assistance.

EQUAL OPPORTUNITY OFFICE

A-289 ASB, PO Box 21220
Provo, UT 84602-1220
(801) 378-6878

Brigham Young University does not allow unlawful discrimination on the basis of race, color, national origin, religion, sex, age, veteran status, or disability in the academic or employment setting. This includes unlawful sexual harassment, which is a violation of university standards as well as state and federal laws and may be considered grounds for discipline. Persons who believe they have been unlawfully discriminated against or unlawfully sexually harassed should contact the Equal Opportunity Office.

RECORDS

Office of Graduate Studies

B-356 ASB, PO Box 21339
Provo, UT 84602-1339
(801) 378-4091

The Office of Graduate Studies maintains student records pertinent to graduate study at BYU, including original applications, approved programs of study, and official transcripts received from other universities.

Records Office

B-150 ASB, PO Box 21114
Provo, UT 84602-1114
(801) 378-2631

The Records Office maintains permanent records of all academic work done at the university. The office is also responsible for issuing official transcripts of credit, which include only courses completed through BYU.

Repeating Classes

Some graduate programs do not allow students to repeat required graduate courses. Those that do are governed by the following policies:

1. Brigham Young University courses may be repeated unless such courses carry an R suffix (see discussion of R suffix below).
2. Courses taken at another university may be repeated at Brigham Young University, but the appropriate BYU department chair must supply a statement of equivalency.
3. Courses taken at another institution may be repeated there and the credit transferred to Brigham Young University. Students wishing to transfer credit to BYU should consult the Credit Policies section of this catalog because not all transfer courses may count toward a graduate degree.

Note: A course repeated at an institution other than the one at which it was taken originally, and other than at BYU, will not be counted as a repeated course.

When a class is repeated, only the last grade earned counts; the grade point average is computed using the grade and credit hours earned the last time the repeated class was taken.

"R" courses are treated differently. Since an R course is one that may be repeated for credit, it is assumed that the subject matter varies from semester to semester in such a course. Therefore, when an R course is repeated, both grades count; the grade point average is computed using the grades and credit of both classes.

Transcript Record Holds

A hold is placed on the record of a student who fails to meet university obligations (fees outstanding, university standards violations, traffic tickets, library fines, etc.). No copy of the transcript or information pertaining to it will be released until the obligation is fulfilled.

Confidentiality of Records Policy

The policy of Brigham Young University concerning confidentiality of student academic records reflects a reasonable balance between the obligation of the university for the instruction and welfare of the student and the university's responsibility to society. The university makes every effort to maintain student academic records in confidence by withholding information from individuals who are not authorized to receive it. Faculty and administrative officers who have a legitimate need to use students' records will be allowed access to such records as needed without prior permission from the student. The Confidentiality of Records Policy is detailed in the University Handbook and the BYU Undergraduate Catalog.

FINANCIAL ASSISTANCE

Graduate Awards

BYU offers four types of graduate awards, all through individual departments—assistantships, internships, private scholarships, and supplementary awards. Because teaching and research are vital components of graduate programs, most graduate awards given by Brigham Young University are in the form of teaching and research assistantships and internships. Supplementary awards are tuition scholarships and can only be used to pay the cost of tuition. Audit credit, credit earned by special examination, or Independent Study may not be paid for by a supplementary tuition award.

Application

New students may apply for graduate awards as part of the regular admission process. Continuing students can obtain information and applications from their departments.

Requirements and Selection

To be eligible for assistantships, internships, or supplementary awards, students must be degree-seeking graduate students in good standing who are registered for at least 2 credit hours in the semester (or 1 credit hour in the term) for which the award is granted. The awards are competitive and generally go to students whose academic performance indicates real merit. All selections are made by academic departments.

Student Loans

Norman B. Finlinson, Director of Student Financial Aid
A-41 ASB, PO Box 21009
Provo, UT 84602-1009
(801) 378-4104

Two types of student loans are available to graduate students who qualify—BYU loans (short-term, Law School, and Marriott School of Management) and Federal Stafford Loans. Only degree-seeking students who are making satisfactory academic progress will be considered for loan approval.

Application

Application materials and information about eligibility and repayment requirements are available in the Financial Aid Office.

Deadlines

Students must submit all application materials for any BYU need-based loans and federal loans by June 1, 1996.

Note: Students with concerns about BYU's management of Title IV financial aid or the accuracy of its educational program information may obtain a copy of complaint procedures at A-185 ASB.

Student Employment

C-40 ASB, PO Box 21004
Provo, UT 84602-1004
(801) 378-3561

Most student campus jobs other than assistantships and internships are listed at Student Employment Services. Students who are ready to seek employment should bring proof of acceptance as a full-time student to this office.

Certain governmental restrictions apply to students from foreign countries. Some students are not eligible to obtain work permits until they have been in school for one semester. The International Services Office is able to determine international student status regarding employment.

Federal immigration regulations require everyone hired in the U.S. to prove eligibility to work in America. U.S. citizens do so by presenting a social security card, state-certified birth certificate, or U.S. passport with a current BYU identification card. Non-U.S. citizens need to present a current passport with attached I-94 or I-20 ID.

GRADUATION POLICIES AND INSTRUCTIONS

All Graduate Students

Final Semester Registration

Before applying for graduation, a graduate student should have completed all course work on his or her approved program of study or be currently registered for the remaining requirements. During the final semester, or the semester of final oral and written examinations, a graduate student must either register or pay an equivalent registration fee to the Office of Graduate Studies for at least 2 semester hours of credit. Audit and independent study credits do not count.

Application for Graduation

Graduate students should apply for graduation by the deadlines listed in the University Graduate Studies Calendar on page 12. Applications received after the deadlines will be processed for the next graduation. To apply for graduation, all students must submit a Graduation Application through their departments and pay the graduation fee to the Cashiers' Office.

After the department has completed its preliminary check and given its approval, the Office of Graduate Studies does a final check. Students will be notified of the results of this evaluation and informed of any problems that need attention.

Graduation Fees

Doctoral candidates	\$25
Master's candidates	\$20
TESL certificate applicants	\$20
Psychological specialists	\$20

1996-97 Graduation Deadlines

See the University Graduate Studies Calendar on page 12 for graduation deadlines.

General Caution: The graduation deadlines are firm. Students submitting materials after the deadlines will be candidates for the *next* graduation.

Students in Dissertation, Thesis, and Selected Project Programs

Students in selected project programs must meet the same requirements as students in dissertation and thesis programs with regard to the scheduling of the

final oral defense, the composition of the graduate committee, and the standards and format of the major written work. The following departments offer selected project programs: Agronomy and Horticulture, Botany and Range Science, Dance, Instructional Science, Nursing, Technology Education and Construction Management, Theatre and Film, and Zoology.

Format Requirements

Colleges and departments, not the Office of Graduate Studies, are responsible for both the content and the format of dissertations, theses, and selected projects. These works are expected to meet the highest standards of excellence in substance and in appearance. The Graduate Council, in its review of graduate programs, and the graduate dean select dissertations, theses, and projects for reading and review.

Requirements regarding the number of copies to be submitted and the format of such items as the title page, the acceptance page, and the abstract page are stated in "Guidelines for Meeting Minimum Standards," available from either the department or the Office of Graduate Studies.

Scheduling the Oral Defense

All students in dissertation, thesis, or selected project programs must schedule the final oral examination *at least two weeks* in advance. Final examinations may not be held during the interim periods between semesters.

Copy of Work Placed in Library

All members of the BYU academic community are invited to attend the final defenses of dissertations and theses. Therefore, all students in dissertation, thesis, or selected project programs are required to place a copy of their work in the Reserve Library (3114 HBLL, PO Box 26817, Provo, UT 84602-6817) at the time the final oral examination is scheduled (two weeks in advance of the oral final) to enable inter-

ested faculty and students to review it before the examination.

Final Copies

Ample time should be allowed for making corrections to the work after the final oral defense and before the deadline for submitting final copies to the library (December 7, 1996, for December 1996; March 21, 1997, for April 1997; and July 11, 1997, for August 1997).

Commencement and Convocation

All candidates for graduation are encouraged to participate in the university's commencement and convocation exercises in either April or August (students completing degrees in December are invited to participate in the following April commencement activities). Doctoral candidates are hooded in the commencement exercises; master's candidates are recognized in their respective college convocation exercises.

Honor Designations

No honor designations are given upon conferral of advanced degrees. Various honor societies, however, may nominate graduate students for membership.

Diplomas and Transcripts

Diplomas are mailed to graduates from six to eight weeks after graduation. Receipt of the degree is recorded on the student's official transcript within one month after graduation, and a complimentary copy of the transcript is mailed with the diploma.

Letter of Completion

After a graduate student has completed all the requirements for graduation, the Office of Graduate Studies can furnish a letter of completion if the student requests it. This document certifies that the student has satisfied all the requirements for the degree and confirms that the degree will be conferred.

CAMPUS FACILITIES AND SERVICES

CULTURAL AND RECREATIONAL RESOURCES

One of the cultural centers of the intermountain region, Brigham Young University offers a wealth of opportunities for students and community members interested in the cultural arts. It is the home of four major museums—the Monte L. Bean Life Science Museum, the Earth Science Museum, the Museum of Peoples and Cultures, and the Museum of Art.

In addition to maintaining a variety of theatres, concert halls, and art galleries for study and performance in drama, music, dance, and the visual arts, BYU sponsors performing arts series that bring to the campus some of the world's most acclaimed musicians. Other offerings include the Honors Program cultural arts series and the International Cinema, which shows foreign films weekly. Moreover, BYU is associated with a professional motion picture studio and an educational television station and FM radio station that broadcast a wide spectrum of programs.

Of prime importance are the general forums and devotional assemblies, which draw together the entire campus to be addressed by prominent Church and national figures. BYUSA-sponsored lectures and college- and department-sponsored lectures by noted scholars also enhance learning.

BYU has an exceptional athletic program, which has achieved national prominence in recent years in men's basketball, football, and golf and women's volleyball and tennis. The Marriott Center, the second largest on-campus indoor arena in the nation, seats 23,000; and the football stadium seats 65,000. Opportunities abound for the participant as well as the spectator through BYU's large intramural program, in which thousands of students participate in more than 60 different events. BYU also has an extensive extramural program in sports such as lacrosse, softball, and soccer.

Situated at the foot of the Wasatch Mountains, BYU offers students a wealth of outdoor recreational opportunities, including some of the best skiing and hiking in the world. Furthermore, Utah's vast desert wilderness and canyon country begins just a few hours from the campus.

Forty-five miles north of Provo is Salt Lake City, home of numerous theatrical, dance, and musical groups, among them Ballet West and the Utah Symphony.

CAMPUS SERVICES OF INTEREST TO GRADUATE STUDENTS

Most specific services for graduate students are provided at the departmental level; therefore, the following items present only the most general information. Information related to specific interests, such as employment in a particular department, is available in individual departments.

Campus Privileges for Graduate Students

Graduate students (excluding EMPA students) who are registered for at least 2 hours per semester or 1 hour per term receive a university activity card (ID card) and are eligible for all on-campus privileges afforded students who are registered full-time, i.e., eligibility for on-campus employment, student housing, student insurance, intramurals, use of physical education facilities (for which EMBA students pay only \$30 per semester), graduate parking permits, and discount admission to sporting and cultural events.

ID Center

120-N ELWC, PO Box 27908
Provo, UT 84602-7908
(801) 378-5092

The Identification (ID) Center provides BYU photo identification cards to BYU students. These cards allow students the campus privileges described above. During the first two weeks of each semester or term, the photo ID cards are produced in a designated place in the Wilkinson Center. Thereafter, cards are available at the ID Center. All ID distribution locations also serve as screening areas for the dress and grooming standards outlined by the university.

University Computing Services

167 TMCB, PO Box 26540
Provo, UT 84602-6540
(801) 378-5025

University Computing Services offers an assortment of computing-related services to faculty, staff, and students. In addition to consultation, the following services are provided:

University Computing Facilities, [801] 378-4053—mainframe systems for use by administrative and academic organizations.

Academic Computing Facilities, [801] 378-3617—support of academic and research functions within the university's colleges and departments.

Testing Services, 265 HGB, PO Box 22701, Provo, UT 84602-2701, telephone [801] 378-6129.

Student Computing Support (SCS), 156 TMCB, PO Box 26573, Provo, UT 84602-6573, telephone [801] 378-3699—student E-mail, networking accounts (cougarNet), etc.

Computer training courses for faculty, staff, and students—recording of scheduled workshops at (801) 378-7246 (37-TRAIN).

Media Services

Managing Director: Dean VanUitert
290 FB, PO Box 24358
Provo, UT 84602-4358
(801) 378-5999

Specialized teams at Media Services combine instructional and technological skills to support academic, church, and entertainment activities throughout campus. Services are custom fit to meet the unique needs of individuals, colleges, departments, and the university infrastructure.

Experts in the Instructional Technology Center generate quality graphic design, desktop publishing, presentation graphics, photography, instructional design, multimedia presentations, and hands-on multimedia training seminars. These services, as well as faculty consultation and in-service training, are available in 130 B-34; or contact the customer service area in 150 Fletcher Building at 378-3068.

Operations employees schedule and deliver audio and visual services to the campus community. Some resources include films, videos, and equipment for recording, display, and projection. Technical crews are available for around-the-clock support with theatrical lighting, video systems, sound reinforcement, and

audio recordings (including forums, devotionals, and BYU firesides). Tape duplication, audio and video editing, and access to an extensive film and tape collection are other valuable services. Call scheduling at 378-3173 to arrange these services.

Engineering, Installation, and Maintenance areas coordinate to provide the design, installation, and maintenance of electronic, data, and communications systems. This involves complex units like TELE classrooms, as well as individual computers, printers, media equipment, cameras, typewriters, etc. Please request services in the Fletcher Building.

Veterans Support Office

B-150 ASB, PO Box 21113
Provo, UT 84602-1113
(801) 378-2768

The Veterans Support Office certifies the enrollment of eligible veterans or their dependents for educational benefits from the Veterans Administration. Information and assistance in applying for these benefits is available from this office.

STUDENT LIFE

Opportunities available through the extracurricular division of the university called Student Life are many and varied, ranging from student (BYUSA) functions and activities to counseling and health services.

Dean of Student Life: Maren M. Mouritsen, Assistant Student Life Vice President, 380 SWKT, PO Box 25542, Provo, UT 84602-5542, telephone (801) 378-4668

Associate Dean: Tamara M. Quick, 329 ELWC, PO Box 27908, Provo, UT 84602-7908, telephone (801) 378-3111

Associate Dean: David M. Sorenson, 169 SWKT, PO Box 25548, Provo, UT 84602-5548, telephone (801) 378-6291

Associate Dean: H. Nolan Reed, 380 SWKT, PO Box 25534, Provo, UT 84602-5534, telephone (801) 378-4771

Ernest L. Wilkinson Center

The Ernest L. Wilkinson Center is the hearthstone of the campus community, where students may relax

and participate in out-of-class activities that foster personal enjoyment and growth. The center is the home for the BYU Student Services Association and the Service Leadership Involvement Center.

Bowling alleys, a copy center, computer facilities, barbershop, post office, outdoor rental shop, ID center, and campus lost-and-found service are on the first level. Facilities on the main level include ballrooms, reading rooms and conversation areas, and a movie theater. The Wilkinson Center also includes the university bookstore, a restaurant, snack bar, and cafeteria.

Bookstore

The BYU Bookstore, housed in the Ernest L. Wilkinson Center, offers a variety of merchandise and services to students, faculty, and staff. Textbooks, school supplies, and a large selection of trade books constitute most of the stock, but students can also buy such items as computer hardware and software, art and office supplies, gifts, health and beauty supplies, clothing and sportswear, CDs and sound equipment, cameras, athletic supplies, and video equipment. The Bookstore offers other services such as check cashing, film processing, UTA bus passes, movie tickets, and a shipping and packaging service.

Religious Opportunities

Students have many excellent opportunities to participate in religious activities at BYU.

BYU Wards and Stakes. The Church of Jesus Christ of Latter-day Saints is organized on campus into a number of stakes composed of several wards (congregations) of 150 to 175 members each. The stakes and wards are organized specifically to give individuals maximum opportunity for Church activity. Spiritual growth and a strong testimony of the divinity of Jesus Christ are goals fostered by the campus stake and ward organizations, whose programs are correlated at all levels with the activities of the university.

All single students living away from home who are members of The Church of Jesus Christ of Latter-day Saints become members of one of the BYU wards. Married students not living in university housing may attend either a BYU ward or the city ward in which they live.

Other Religious Denominations. Approximately 25 other religious denominations are represented by

BYU students. These students are encouraged to attend the congregation of their faith in the Provo area.

Devotionals, Forums, and Firesides. Each Tuesday at 11 a.m., General Authorities, other Church leaders, faculty, or special university guests speak to general devotional or forum assemblies of faculty and students in the Marriott Center. Their messages encourage education, commitment, faith, and adherence to Church standards. Once a month in the Marriott Center, usually the first Sunday evening, Church leaders speak to students in services sponsored by the Church Educational System. Many of these fireside services are broadcast live on the Church satellite television network to Institutes of Religion throughout the United States and Canada.

Student Health Center

Director: Val H. Christensen
168 MHC, PO Box 24800
Provo, UT 84602-4800
(801) 378-7443

Student health services are available to all students at the Howard S. McDonald Student Health Center. Hospitalization, when necessary, is available locally at the Utah Valley Regional Medical Center. The Health Center offers urgent care, consultation with physicians by appointment, immunization, pharmacy service, physical therapy, laboratory tests, and X-ray examinations. Also, a brochure describing student health and insurance plans is available at the Health Center.

Counseling and Development Center

Director: David M. Sorenson
169 SWKT, PO Box 25548
Provo, UT 84602-5548
(801) 378-6291

The Counseling and Development Center provides counseling, instruction, and support that includes:

- Academic support
- Career counseling and information
- Open major advisement
- Personal and group counseling
- Services for students with disabilities
- Women's services and resources
- 24-hour emergency counseling

Ethnic Student Services

Associate Director: Jimmy Benally
199 ELWC, PO Box 27908
Provo, UT 84602-7908
(801) 378-3065

Ethnic Student Services publishes the *Eagle's Eye*, supports the Lamanite Generation, and helps American minority students succeed in college work by providing the following support services:

1. Academic Support

The office offers personal encouragement and academic advisement to all American minority students.

2. Financial Aid

The office assists American minority students in securing financial aid.

International Services

Manager: Enoc Flores
350 SWKT, PO Box 25520
Provo, UT 84602-5520
(801) 378-2695

This office provides visa support, advisement and services to all international students, visitors, exchange scholars; aliens with permanent residence in the United States; and other interested parties within the university community.

Services for Students with Disabilities

160 SWKT, PO Box 25541
Provo, UT 84602-5541
(801) 378-2767 v/TTY

BYU offers a variety of services for students with physical or learning disabilities on application for services. Hearing-impaired students have access to classroom interpreters, Com-Teks, and TTY communications. Visually-impaired students have access to volunteer readers, Visualteks, a talking computer with enlarged screen print, taped textbooks, and braille writers. Mobility-impaired students may receive help with arranging access to buildings on campus and note-taking services. Learning disabled students may be helped by free assessment, volunteer readers, taped textbooks, and other appropriate services. Support groups for learning disabilities, ADHD, and chronic pain and illness are available.

Ombudsman

BYUSA, 447 ELWC, PO Box 27908
Provo, UT 84602-7908
(801) 378-4132

The Ombudsman's Office investigates and expresses conclusions when a student is aggrieved by an official's action or inaction and acts as an impartial mediator in resolving disputes between students and businesses, organizations, or individuals. Basic legal advice is also provided by this office.

Honor Code Council

Advisor: Richelle Andersen
366 SWKT, PO Box 25533
Provo, UT 84602-5533
(801) 378-3758

In 1990 the BYU Board of Trustees approved an update of the Honor Code and the Dress and Grooming Standards. An important part of that revision was the creation of the student Honor Code Council. The council has three primary objectives: (1) educate the members of the campus community on matters related to the Honor Code and associated standards, (2) work with students who have difficulties in abiding by the precepts of certain portions of the code, and (3) develop policies and procedures related to the activities of the HCC.

Student Service Association (BYUSA)

4th Floor, ELWC, PO Box 27903
Provo, UT 84602-7903
(801) 378-3901

The mission of the Student Service Association is to strengthen students in their social relationships, civic duty, and service to mankind. Through student leadership, the university community works together to achieve our goal that all who "enter to learn" will be prepared by training and experience to "go forth to serve."

The association consists of five branches, which are made up of student volunteers and officers. The *Student Advisory Council (SAC)* consists of student representatives, elected and appointed, from each college on campus. Most student activities and events are planned through *Campus Life*. *Community Service* matches volunteers with service opportunities on and off campus. *University Relations* helps to bind together all the on-campus student organizations and

clubs. The *Administrative Branch* supports and binds the other branches together.

All Brigham Young University students are invited to participate or plan any of the numerous programs and activities that are available through BYUSA. For further information on involvement opportunities contact BYUSA.

UNIVERSITY POLICE AND TRAFFIC

B-66 ASB, PO Box 21008

Provo, UT 84602-1008

(801) 378-2222 (Emergency: 911)

The University Police Department is established for the benefit and protection of students, faculty, and staff. The department's state-certified police officers are entrusted with enforcing laws and campus rules and regulations.

All matters requiring police assistance on campus should be directed to this office.

Vehicle Registration and Parking Permits

GRNH, PO Box 20300

Provo, UT 84602-0300

(801) 378-3906

Parking and traffic control are the responsibility of the University Police Traffic Services, located in the Traffic Office east of the Carillon Bell Tower on 1430 North. All BYU students who intend to park in student lots during restricted hours (7 a.m.–4 p.m. Monday through Friday) must register their motor vehicles with the Traffic Division and obtain a parking permit.

To purchase a permit, students should bring their current vehicle registration, proof of emissions compliance, and BYU ID to the Traffic Office.

A limited number of parking spaces near the Law School and the Marriott School of Management have been designated as "G-Parking" lots. Graduate students are given priority in purchasing permits for these lots. The permits do not guarantee a parking space but allow a student to park in the designated stall when space is available. Issued at a ratio of two for each G stall, the permits cost \$40. Permits for other parking spaces are available for \$15. For more information about the procedures and application deadlines for obtaining a G permit, students can

contact the Office of Graduate Studies, the Traffic Office, or their department.

Out-of-State Plates

If a student is married and his or her spouse is a non-student employed full-time, then the vehicle must be licensed in the state of Utah and cleared for tax payment. This is done at the Utah Motor Vehicles Division, 150 East Center, Provo.

Faculty and staff employees with out-of-state plates must license their vehicles with the state of Utah and clear them for tax payment before they can receive their parking permits.

Nonresident permits are no longer required for out-of-state plates.

Bicycle Registration

All bicycles that are operated, parked, or stored on campus by any student, employee, or visitor must display a current bicycle license from a Utah County city. The fee for a Provo bicycle license is \$1. Provo city bicycle licenses can be obtained at the Traffic Office or at the Provo City Center, 359 West Center.

Bicycles may not be ridden on the main campus during class breaks. To avoid impoundment and damaged locks, bicycles must be parked in authorized bicycle racks. Bicycle locks, chains, or cables may not be cut unless a uniformed police officer or traffic officer is present.

Other Regulations and Information

Owner/Operators of motor vehicles operated in Utah County should be prepared to pass Utah County Vehicle Emissions Inspection Maintenance requirements.

Neighborhoods adjoining campus are sometimes inundated with parked vehicles. Students are encouraged to obtain BYU parking permits and to park in university parking lots authorized by the permit.

Traffic regulation information may be obtained from the Traffic Office. It is the responsibility of all students, faculty, and staff members to obey all traffic rules and regulations.

Questions may be directed to Traffic Office personnel at (801) 378-3906.

HOUSING

Housing Business Office

100 SASB, PO Box 21820
Provo, UT 84602-1820
(801) 378-2611
Fax #: (801) 378-6939
E-mail address: housing@byu.edu

Student housing is available both on campus and in the surrounding communities; policies have been established within campus residence halls and with off-campus landlords to integrate living experiences with the complete educational experience.

Campus Housing: Single Students

Campus housing for single students includes room-and-board residence halls and apartment-type facilities.

Room and Board. Deseret Towers and Helaman Halls are room-and-board facilities for men and women. Residents of these complexes have access to in-hall university classes, math labs, reading/writing tutors, computer facilities, and health and wellness counseling. Each complex has all-you-can-eat dining rooms, a snack bar, a lounge with a large-screen TV, and administrative offices. Laundry and storage facilities, linen service, piano rooms, and a basement kitchenette are available in each hall. Graduate students at Deseret Towers can request floors that have dayrooms furnished with a microwave, sink, couch, chairs, and a television. Helaman Halls has a limited number of suites for women and expanded rooms with sinks for men. A swimming pool, basketball and sand volleyball courts, and large lawn areas are also available.

Apartment Style. Heritage Halls offers apartment-style living for both women and men. The one-, two-, and three-bedroom apartments have a bathroom and a kitchen/dining area with a microwave and dishwasher. Each hall has large lounge areas, a recreation room, and laundry and storage facilities. A computer lab, health and wellness counseling, university-credit classes, multipurpose activity rooms, a homemaking resource center, and administrative offices are located at the Heritage Halls Central Building. Sports courts, sand volleyball courts, large patios, and barbecue facilities are also available.

The Foreign Language Student Residence provides single students with hands-on experience while refining their language skills. Residents in each apartment study the same language and agree to speak only that language within their living quarters. A native speaker in each apartment provides language assistance, and in-room cable programs supply additional language training. Residents of similar languages participate in five evening meals per week, with the cost of these meals included in the complex's fees. The 25 three-bedroom apartments for men and women can house more than 20 different language groups. Each apartment is completely furnished, including a dishwasher, microwave, table and chairs, couch and chairs, television, and VCR. Large lawn areas and sports courts are also available.

Campus Housing: Student Families

Accommodations for 1,048 student families are provided at Wymount Terrace and Wyview Park. Each apartment at Wymount Terrace and each mobile home at Wyview Park is furnished with an electric or gas range, refrigerator, blinds, garbage disposal, and storage/dresser drawers in each bedroom. A limited amount of rental furniture is available from the Student Family Housing Office. Sports courts, access to single housing area swimming pools, children's playgrounds, and large lawn areas are also available.

Wymount Terrace has one bedroom, one bedroom/study, two bedroom, and three bedroom apartments. These apartments do not have washer/dryer hookups, but the complex has five self-service laundry facilities. A Dairy Products Outlet and a computer lab are located in the Student Family Housing Office at Wymount Terrace.

Wyview Park consists of one-, two-, and three-bedroom mobile homes placed on permanent foundations. These mobile homes have washer/dryer hookups and evaporative coolers. A laundry facility is available for those without a washer/dryer.

Applications/Agreements for Campus Housing

Students who plan to enroll at BYU and live in a university residence hall or a student family housing complex are advised to obtain the appropriate application/agreement from the Housing Business Office at least one year in advance. For single student housing, the completed agreement must be returned with a nonrefundable \$50 application fee and a \$100 security deposit. For student family housing, the

completed application must be returned with a non-refundable \$25 application fee. Placement into on-campus housing is made according to the date the application or agreement is received by the Housing Business Office. Acceptance into on-campus housing is not a commitment of admission to the university.

Off-Campus Housing

255 ELWC, PO Box 27905
Provo, UT 84602-7905
(801) 378-5066

The BYU Off-Campus Housing Office aids students in finding off-campus housing, encourages landlords of university-approved housing to maintain and improve rental facilities, advises students and landlords in their relationships with one another, and attempts to assure that BYU living standards are maintained in university-approved off-campus rentals. BYU graduate students are encouraged, but not required, to live in university-approved housing. At present,

more than 24,000 rental spaces have been approved by the university for off-campus living.

BYU Housing Referral Service

The Off-Campus Housing Office maintains a complete referral service for all university-approved rental facilities. Thousands of rental units of all types are available, including large apartment complexes, condominiums, duplexes, houses, basement apartments, and sleeping rooms. Some housing for student families is also listed, though family student housing is not subject to university approval.

Detailed lists of current vacancies are available at the Off-Campus Housing Office from 8 a.m. to 5 p.m. Monday through Friday. Because such lists are constantly updated, they are not sent to prospective renters through the mail. However, a guide with essential rental data on the large apartment complexes will be mailed on request. Consultants are also available to help students who have problems finding suitable off-campus housing.

Catalog Terms and Abbreviations

The following terms and abbreviations are used throughout the catalog.

Course Number. This catalog does not list courses numbered below 500. For listings of undergraduate courses, see the BYU Undergraduate Catalog. Courses numbered below 500 are undergraduate courses, courses numbered 500–599 are either graduate courses or advanced undergraduate courses, and courses numbered 600 and above (600–799) are graduate courses. Most, but not all, 500-level courses can count toward a graduate degree. Restrictions and limitations are noted in the Credit Policies section of this catalog and also in the program requirements for each department.

Credit Hour Designation. The number that follows each course title is the number of semester hours of credit designated for the class.

Abbreviations and Symbols. The following abbreviations and symbols are used in the course listings:

Arr.	Credit, class, or laboratory hours are arranged through consultation with department or instructor
ea.	Credit hour designation applies to each registration
R	Designates a course that may be repeated for credit
□	Cross-referenced course—one that originates in one department but may count for credit in another
(19 _)	Date faculty member was hired
Alt. sem.	Course is offered alternate semesters
Alt. term	Course is offered alternate terms
Alt. yr.	Course is offered alternate years
Even yr.	Course is offered even years
Odd yr.	Course is offered odd years
On dem.	Course is offered “on demand,” that is, when enough students request it to justify offering it

Areas of Study	Abbreviations
Accounting	Acc
Agronomy and Horticulture	AgHrt
Animal Science	AnSc
Anthropology	Anthr
Art (see Visual Arts)	
Botany and Range Science	Botny, Range
Chemical Engineering	ChEn
Chemistry and Biochemistry	Chem
Civil and Environmental Engineering	CEEn
Clothing and Textiles	CITx
Communications	Comms
Computer Science	CS
Dance	Dance
Design (see Visual Arts)	
Economics	Econ
Educational Leadership	ELdr
Educational Psychology	EPsy
Elementary Education	EIEd
Electrical and Computer Engineering	ECEn
Engineering Sciences and Technology	EngT
English	Engl
Family Sciences	FamSc
Food Science and Nutrition	FSN
Geography	Geog
Geology	Geol
Health Sciences	HLth
History	Hist
Humanities	Hum
Classics	Clscs
Comparative Literature	CLit
Instructional Science	IS
International and Area Studies	IAS
Languages	
Arabic	Arab
Chinese	Chin
French	Fren
German	Germ
Hebrew	Heb
Italian	Ital
Portuguese	Port
Russian	Russ
Scandinavian	Scand

Spanish	Span
Law School	Law
Linguistics	Ling
Teaching English as a Second Language	ESL
Management	Mgt
Management Communication	MCom
Managerial Economics	ManEc
Manufacturing Engineering and Engineering Technology	MFET
Mathematics	Math
Mechanical Engineering	MeEn
Microbiology	Mcbio
Music	Music
Nursing	Nurs
Organizational Behavior	OrgB
Philosophy	Phil
Physical Education	PE

Physics and Astronomy	Phscs
Psychology	Psych
Political Science	PLSc
Public Management, Institute of	PMgt
Recreation Management and Youth Leadership	RMYL
Religious Education	
Ancient Scripture	RelA
Church History and Doctrine	RelC
Secondary Education	ScEd
Social Work	SocW
Sociology	Soc
Statistics	Stat
Technology Education	TecE
Theatre and Film	ThF
Visual Arts	VAStu
Zoology	Zool

COLLEGES AND SCHOOLS

COLLEGE OF BIOLOGY AND AGRICULTURE

301 WIDB, PO Box 25250
Provo, UT 84602-5250
(801) 378-3963

Dean: Clayton S. Huber, Professor, Food Science and Nutrition

Associate Dean, Graduate Studies: Richard W. Heninger Professor, Zoology

Associate Dean: William L. Park, Professor, Economics

The departments in the College of Biology and Agriculture offer the following graduate degrees:

Agronomy and Horticulture

MS Agronomy

MS Horticulture

Animal Science

MS Animal Science

Botany and Range Science

MS Biological Science Education

MS, PhD Botany

MS Range Science

MS, PhD Wildlife and Range Resources

Food Science and Nutrition

MS Food Science

MS Nutrition

Microbiology

MS, PhD Microbiology

Zoology

MS Biological Science Education

MS, PhD Zoology

The College of Biology and Agriculture also offers the following:

Molecular Biology

Students can pursue an MS degree in molecular biology through any department in the college (Agronomy and Horticulture, Animal Science, Botany and Range Science, Food Science and Nutrition, Microbiology, or Zoology). Students can pursue a PhD degree in molecular biology through the Departments of Botany and Range Science, Microbiology, or Zoology. See listing under the Molecular Biology section

of this catalog, as well as each department, for requirements.

COLLEGE OF EDUCATION

343 MCKB, PO Box 25095
Provo, UT 84602-5095
(801) 378-3694

Dean: Robert S. Patterson, Professor, Educational Leadership

Associate Dean: Beverly R. Cutler, Associate Professor, Elementary Education

Associate Dean: Russell T. Osguthorpe, Professor, Instructional Science

The departments in the College of Education offer the following graduate degrees:

Educational Leadership

MEd, EdD, PhD Educational Leadership

Educational Psychology

MS Audiology

MS Counseling and Guidance

MS School Psychology

MS Special Education

MS Speech-Language Pathology

PhD Counseling Psychology

Elementary Education

MA, MEd Teaching and Learning

EdD Reading

Instructional Science

MS, PhD Instructional Science

PhD Instructional Psychology

COLLEGE OF ENGINEERING AND TECHNOLOGY

270 CB, PO Box 21345
Provo, UT 84602-1345
(801) 378-4326

Dean: Douglas M. Chabries, Professor, Electrical and Computer Engineering

Associate Dean, Research: Linton G. Salmon, Professor, Electrical and Computer Engineering

Associate Dean, Curriculum and Graduate Studies:

Joseph C. Free, Professor, Mechanical Engineering

Assistant Dean, External Relations: David K. Anthony

The departments in the College of Engineering and Technology offer the following graduate degrees:

Chemical Engineering

MS, PhD Chemical Engineering

MEM Engineering Management

Civil and Environmental Engineering

MS, PhD Civil Engineering

MEM Engineering Management

Electrical and Computer Engineering

MS, PhD Electrical Engineering

MEM Engineering Management

MTM Technology Management

Manufacturing Engineering and Engineering Technology

MS Computer-Integrated Manufacturing

MS Manufacturing Engineering

MS Manufacturing Engineering—Industrial

MEM Engineering Management

MTM Technology Management

Mechanical Engineering

MS, PhD Mechanical Engineering

MEM Engineering Management

Technology Education and Construction Management

MS Technology Education

COLLEGE OF FAMILY, HOME, AND SOCIAL SCIENCES

990 SWKT, PO Box 25535
Provo, UT 84602-5535
(801) 378-2083

Dean: Clayne L. Pope, Professor, Economics

Associate Dean, Graduate Studies and Curriculum:

Paul B. Pixton, Professor, History

Associate Dean, Research and Faculty

Development: Dennis L Thomson, Professor, Political Science

The departments in the College of Family, Home, and Social Sciences offer the following graduate degrees:

Anthropology

MA Anthropology

Clothing and Textiles

Economics

Family Sciences

MS, PhD Family Sciences

MS, PhD Marriage and Family Therapy

Geography

MS Geography

History

MA, PhD History

Political Science

MA Public Policy

Psychology

PhD Clinical Psychology

MS, PhD Psychology

Social Work

MSW Social Work

Sociology

MS, PhD Sociology

Interdisciplinary Program

The College of Family, Home, and Social Sciences has an interdisciplinary program in international and area studies (MA) through the David M. Kennedy Center for International and Area Studies.

COLLEGE OF FINE ARTS AND COMMUNICATIONS

A-410 HFAC, PO Box 26401
Provo, UT 84602-5250
(801) 378-2818

Dean: Bruce L. Christensen, Professor,
Communications

Associate Dean, Graduate Studies: David M.
Randall, Professor, Music

The departments in the College of Fine Arts and Communications offer the following graduate degrees:

Communications

MA Mass Communication

Music

MA, MM, PhD Music

Theatre and Film

MFA Theatre, Design, and Technology

MA, PhD Theatre and Film

Visual Arts

MA Art Education

MA Art History

MFA Art Studio

COLLEGE OF HUMANITIES

2054 JKHB, PO Box 26001
Provo, UT 84602-6001
(801) 378-2775

Dean: Randall L. Jones, Professor, German

Associate Dean: Edward A. Geary, Professor, English

Associate Dean: Cheryl Brown, Associate Professor,
Linguistics

The departments in the College of Humanities offer the following graduate degrees:

Asian and Near Eastern Languages

English

MA English

French and Italian

MA French Studies

Germanic and Slavic Languages

MA German Literature

Humanities, Classics, and Comparative Literature

MA Comparative Literature

MA Humanities

Linguistics

MA Linguistics

MA Teaching English as a Second Language

TESL Certificate Teaching English as a Second
Language

Philosophy

Spanish and Portuguese

MA Portuguese

MA Spanish

The Collegewide Language Acquisition Program offers an MA with specializations in the following languages:

Arabic	German	Portuguese
Chinese	Japanese	Russian
French	Korean	Scandinavian

J. REUBEN CLARK LAW SCHOOL

348-A JRCB, PO Box 28001
Provo, UT 84602-8001
(801) 378-4274

Dean: H. Reese Hansen

Associate Dean: J. Clifton Fleming, Jr.

Associate Dean: Constance K. Lundberg

Associate Dean: Scott W. Cameron

Assistant Dean: Kathy D. Pullins

Juris Doctorate (JD)

The J. Reuben Clark Law School offers a six-semester course of graduate professional study leading to the juris doctorate (JD) degree. Information about legal education, admissions standards and procedures, and related matters can be obtained from the J. Reuben Clark Law School Bulletin, which is available through the admissions office of the Law School.

Master of Laws (LLM)

The master of laws (LLM) degree is conferred upon successful completion of a minimum 24 credit hours earned during at least two semesters in residence following completion of a JD degree or its equivalent outside the United States. Information and applications are available through the admissions office of the Law School, 340 JRCB, PO Box 28001, Provo, UT 84602-8001.

J. WILLARD AND ALICE S. MARRIOTT SCHOOL OF MANAGEMENT

730 TNRB, PO Box 23113
Provo, UT 84602-3113
(801) 378-4121

Dean: K. Fred Skousen, Professor, Accounting

Associate Dean: Kim S. Cameron, Professor,
Organizational Behavior

Associate Dean: Gary C. Cornia, Professor, Public
Management

The Marriott School of Management offers both undergraduate and graduate programs. Its Graduate School of Management comprises four professional programs:

Master of Accountancy

Master of Business Administration

Master of Organizational Behavior

Master of Public Administration

Managerial Economics

The Department of Managerial Economics offers a graduate degree program leading to a master's degree in managerial economics. Students should apply for this program through the Office of Graduate Studies rather than the Graduate School of Management.

COLLEGE OF NURSING

593 SWKT, PO Box 25532
Provo, UT 84602-5532
(801) 378-4144

Dean: Sandra Rogers, Associate Professor, Nursing

Associate Dean, Curriculum: Lynn Callister,
Assistant Professor, Nursing

Associate Dean, Student Affairs: Mary Williams,
Associate Professor, Nursing

Associate Dean, Scholarship: Elaine Sorensen,
Associate Professor, Nursing

The College of Nursing offers a nationally accredited program leading to the master of science degree. Areas of specialization include: Family Nurse Practitioner and Nursing Administration.

COLLEGE OF PHYSICAL AND MATHEMATICAL SCIENCES

1147 TMCB, PO Box 24578
Provo, UT 84602-4578
(801) 378-2674

Dean: Bill R. Hays, Professor, Computer Science

Associate Dean: Nolan F. Mangelson, Professor,
Chemistry and Biochemistry

Associate Dean: Larry C. Christensen, Professor,
Computer Science

The departments in the College of Physical and Mathematical Sciences offer the following graduate degrees:

Chemistry and Biochemistry

MS, PhD Biochemistry

MS, PhD Chemistry

Computer Science

MS, PhD Computer Science

Geology

MS Geology

Mathematics

MA Mathematics Education

MA, MS, PhD Mathematics

Physics and Astronomy

MS, PhD Physics

PhD Physics and Astronomy

Statistics

MS Statistics

COLLEGE OF PHYSICAL EDUCATION

212 RB, PO Box 22113
Provo, UT 84602-2113
(801) 378-2645

Dean: Robert K. Conlee, Professor, Physical Education

Associate Dean, Graduate Studies: Joyce M. Harrison, Professor, Physical Education

Associate Dean: Jay H. Naylor, Professor, Recreation Management and Youth Leadership

The departments in the College of Physical Education offer the following degrees:

Dance

MA Dance

Health Sciences

MS Health Sciences

Physical Education

MEd Physical Education

MS Physical Education

EdD Physical Education Administration,
Curriculum, and Instruction

PhD Exercise Science/Wellness

Recreation Management and Youth Leadership

MS Recreation Administration

RELIGIOUS EDUCATION

370 JSB, PO Box 25693
Provo, UT 84602-5693
(801) 378-2735

Dean: Robert L. Millet, Professor, Ancient Scripture

Associate Dean: Donald Q. Cannon, Professor,
Church History and Doctrine

Associate Dean: Larry E. Dahl, Professor, Church
History and Doctrine

Religious Education offers graduate minors, but not graduate majors. See Departments of Ancient Scripture and Church History and Doctrine in the Religion section of this catalog.

ACADEMIC DEPARTMENTS, DEGREES, AND COURSES

ACCOUNTANCY AND INFORMATION SYSTEMS

Chair: W. Steve Albrecht
*Associate Director and Graduate
Coordinator:* Kevin D. Stocks

560 TNRB
PO Box 23068
Provo, UT 84602-3068
(801) 378-4235

THE PROGRAM OF STUDIES

School of Accountancy and Information Systems

The Master of Accountancy (MAcc) Program, administered through the School of Accountancy and Information Systems within the Marriott School of Management, offers a general background in accounting, with an emphasis on business-related subjects and an in-depth study of one or more areas of accounting. The MAcc degree is awarded on completion of a professional program, which can begin as early as the junior year of the undergraduate program, and culminates in the Marriott School of Management after the fifth year. Students entering the School of Accountancy and Information Systems Program with a baccalaureate degree in accounting can complete the program in less than two years.

The objective of the program is to develop graduates who exhibit professionalism and are qualified with specialized knowledge in one or more accounting areas. The SOAIS seeks to educate individuals who are: (1) imbued with a strong sense of professional commitment, (2) qualified with specialized knowledge in the areas of

accounting, information systems, or tax, (3) committed to continued professionalism—beyond formal education, and (4) capable of becoming leaders who exhibit high standards of ethical conduct within their chosen profession.

Three degrees are offered through the School of Accountancy and Information Systems: Professional Accountancy—MAcc, Information Systems—MAcc, and Tax—MAcc. In addition, the SOAIS offers a joint program whereby qualified students may obtain both the MAcc and the JD degree during a specified period of time by meeting certain requirements. Inquiries regarding this program should be directed to the School of Accountancy and Information Systems, 560 TNRB.

The SOAIS admits an average of 150 students per year into its graduate program.

Professional Accountancy, Information Systems, Tax—MAcc

The Professional Accountancy Program is designed for students who wish to gain a broad base of graduate accounting training. Students typically seek accounting positions in auditing, management, not-for-profit, or PhD programs.

Information Systems Program graduates typically have been placed in consulting practices of public accounting firms or in the systems area of industrial companies.

Tax graduates usually begin careers in the tax area of public accounting firms.

Admission and Entry.

- Semesters of entry and application deadlines: fall, March 1 (U.S. and international).
- Application requirements: complete GSM application.
- Entrance examination: GMAT.
- Prerequisite: minimum 3.0 GPA; pre-management core courses Econ 110, Acc 200, Math 119, Stat 222; pre-accounting core courses Acc 210, 341, MCom 320; computer proficiency.

Requirements for Degree.

- First-year courses (for students seeking BS and MAcc concurrently): SOAIS core comprising Acc 401, 402, 403, 404.
- Common requirements: graduate MSM core comprising finance, management, operations, organizational behavior, management communication, management seminar, personal development, MBA 581, 682.
- Majors:
 - Professional Accountancy:* MBA 620–629; Acc 503, 522, 562, 612, 691R, finance elective. Elective group: 15 hours, of which at least 6 must be nonaccounting, from any MSM course *not* selected above or other courses approved by program coordinator. Acc 343 counts as a nonaccounting course.
 - Information Systems:* Acc 657, ISys 441, 643, 644, 645, 646. Elective group: 15 hours, of which 6 must be accounting, from any MSM course *not* already selected above or other courses as approved by program coordinator. Acc 343 counts as a nonaccounting course.
 - Tax:* Acc 503, 523, 556, 620–624. Elective group A: 3 hours from Acc 625R, 626, 628; elective group B: 6 hours from any MSM course *not* selected above or other courses as approved by program coordinator; 3 hours must be nonaccounting. Acc 343 counts as a nonaccounting

course. Tax classes are not acceptable for group B.

The Marriott School of Management produces a graduate catalog that has greater details regarding this program, which is best completed in the manner and sequence recommended by the school. The above outline does not represent the full range of requirements and opportunities in the program.

FINANCIAL ASSISTANCE

The School of Accountancy and Information Systems utilizes the Marriott School of Management's financial aid provisions. Qualified students can receive aid from the following: the MSM Scholarship Fund, private scholarship donations, assistantship awards, and loan assistance. The MSM currently has over twenty-five established, private scholarships. Only limited scholarship funds are available through the SOAIS.

RESOURCES AND OPPORTUNITIES

The N. Eldon Tanner Building. The Tanner Building, which houses the Marriott School of Management, is one of the finest facilities of its kind. Surrounding the dramatic eight-story atrium at its center are lecture and seminar rooms, study rooms, a computer laboratory, and a working library.

The Marriott School of Management. The MSM is recognized as one of the outstanding management schools in the nation. Faculty are actively engaged in research and publication, and they fill leadership positions in a number of national professional organizations. The school has developed innovative educational programs that include internships, executive visitation programs, special student consulting and research projects, and other activities designed to bring management education and training closer to management practice. This is accomplished, in part, through the MSM's National

Advisory Council, and the Executives on Campus Program.

National Advisory Council. Consisting of sixty-five to seventy prominent business and government executives, the National Advisory Council lends major support to the Marriott School of Management. Students benefit by interacting with council members in special campus lectures and seminars and by visiting or working with these executives in their respective organizations. Furthermore, the council assists students with placement opportunities, helps develop funding sources for scholarships, and provides professional development for faculty members.

The Executives on Campus Program. This program gives students an opportunity to interact with distinguished business and government leaders who come to campus. These executives visit classes and meet with student organizations as well as participate in the Executive Lecture Series and Entrepreneurship Lecture Series.

COURSE DESCRIPTIONS

Accountancy

503. Advanced Financial Accounting. (3)

Prerequisite: SOAIS core.

Advanced financial accounting topics including pensions, earnings per share, accounting changes, and deferred income taxes.

505. Special Problems in Accounting 1. (3)

Partnerships, estates and trusts, and consolidations.

507. Accounting for Nonprofit Organizations. (3)

Accounting concepts and methods peculiar to governmental units, universities, hospitals, and other nonprofit organizations.

522. Advanced Taxation. (3)

Tax laws as they apply to selected tax entities, with an introduction to tax research methodology.

523. Tax Research Methodology. (3)

In-depth treatment of research and procedures emphasizing communication and presentation of findings.

532. Advanced Mathematics of Business. (3)

Introduction to management science. Topics selected from linear programming, sensitivity analysis, transportation and assignment method, network analysis, queuing theory, decision theory, forecasting, simulation, and discriminant analysis.

556. Computer Applications in Tax Practice. (3)

In-depth analysis of software and systems used in tax practice, emphasizing electronic work sheet, research, and applications packages used in the tax field. Designing solutions to various tax problems that will emphasize the "what if" type of resolution.

562. Financial Auditing Methodology. (3)

Financial auditing methodology and professional auditing standards necessary to conduct a modern external audit.

584. International Accounting and Multinational Enterprises. (3)

Accounting from an international perspective: flow of information in multiple currencies, complying with reporting requirements, setting budgets and monitoring performance, and controlling corporate assets through reports and audits.

586. Contemporary Professional Accounting Problems. (3)

Accounting problems, emphasizing those encountered in professional CPA examinations.

599R. Accounting Internship. (1-3)

On-the-job experience and training in industry, government, or public accounting firms.

612. Managerial Cost Accounting. (3)
Specialized areas in cost determination and cost allocation.

616. Operational Auditing. (3)
Seminar in operational auditing, emphasizing the business planning process.

620. Special Problems in Federal Taxation. (3)
Special property transactions, accounting periods and methods, tax payments and credit, tax concepts, and reporting tax liability.

621. Corporate Taxation 1. (3)
Federal income taxation of corporations and shareholders.

622. Corporate Taxation 2. (3)
Continuation of Corporate Taxation 1. Includes consolidated returns.

623. Taxation of Partnerships. (3)
Federal income taxation of general and limited partnerships and partners.

624. Taxation of Estates, Gifts, and Fiduciaries. (3)
Federal taxation of property transferred by death and gift; federal taxation of income of trusts and estates.

625R. Current Tax Policy. (3)
Intensive study of special and current tax topics and policies.

626. Taxation of Deferred Compensation and Fringe Benefits. (3)
Federal legislation and regulations treating pensions, profit-sharing plans, and other types of deferred compensation; fringe-benefit problems.

628. Taxation of Foreign Income. (3)
Federal taxation of foreign transactions.

657. Management Consulting and Projects. (3)
Projects-oriented course where students get hands-on experience performing consulting jobs for businesses in Utah. Class includes both in-class instruction and business experience.

691R. Research Seminar. (3)
Case-based approach to researching accounting and auditing professional standards. Finding answers to practical accounting problems.

692R. Advanced Topics in Accounting. (3)
Subject matter varies with needs of students and with instructor. Most often taught are fraud auditing and forensic accounting, EDP auditing, and a CPA's role in personal financial planning.

693R. Readings and Conference. (1-3)
Prerequisite: SOAIS director's consent.
In-depth study one-on-one with chosen professor on topic of mutual interest not currently covered in existing courses.

Information Systems

542. Object-Oriented Programming. (3)
Prerequisite: ISys 441 or equivalent programming experience.

Concepts and applications of an object-oriented language such as C++ or *SmallTalk*.

544. Information Systems Design. (3)
Prerequisite: ISys 443, 445, 546 (546 may be taken concurrently with ISys 544).

Concepts and techniques of systems design, emphasizing systems development, systems development tools, and related topics.

546. Fourth-Generation Programming Languages. (3)
Prerequisite: ISys 441.
The 4GLs are database languages. Theoretical foundations, Structured Query Language (SQL), application building (menus, forms, reports), and utilizing tools and program language of Database Management Systems (DBMS).

548. Data Communications. (3)
Prerequisite: SOAIS Core or ISys 301.
Principles of data communications, local and wide-area networks, hardware, software, media standards, application, implementation, and management.

643. Information Systems Analysis. (3)
Prerequisite: admission to MSM graduate program.
Advanced systems analysis and design, emphasizing information requirements, input/output analysis, and procedure documentation.

644. Advanced Information Systems Design. (3)
Prerequisite: ISys 643.
Advanced concepts and techniques of systems analysis and design, emphasizing systems development, systems development tools, prototyping, and related topics.

645. Advanced Database Analysis and Design. (3)
Advanced database organization, emphasizing conceptual and logical design, semantic modeling, database integrity, and security.

646. Advanced Fourth-Generation Programming Languages. (3)
Advanced skills development in programming languages, emphasizing fourth-generation languages.

FACULTY

ALBRECHT, W. STEVE, *Professor*. PhD, University of Wisconsin, 1975. Financial; Audit Systems.
BOYER, GLEN L., *Associate Professor*. PhD, University of North Dakota, 1972. Information Systems.
CAMERON, JAMES B., *Professor*. PhD, Montana State University, 1967. Financial; Audit Systems.
CHERRINGTON, J. OWEN, *Professor*. PhD, University of Minnesota, Minneapolis, 1972. Financial; Systems.
COTTRELL, DAVID M., *Assistant Professor*. PhD, Ohio State University, 1992. Managerial Accounting.

DALEBOUT, RICHARD S., *Associate Professor*. SJD, University of Utah, 1971. Business Law.

DENNA, ERIC L., *Associate Professor*. PhD, Michigan State University, 1989. Information Systems.

GARDNER, ROBERT L., *Professor*. PhD, University of Texas, Austin, 1979. Tax.

GLOVER, STEVEN M., *Assistant Professor*. PhD, University of Washington, 1994. Audit; Financial; Managerial.

HANSEN, GARY W., *Associate Professor*. PhD, Indiana University, 1974. Information Systems.

HANSEN, JAMES V., *Professor*. PhD, University of Washington, 1973. Information Systems.

HARDY, JOHN W., *Professor*. PhD, University of Texas, Austin, 1972. Managerial Accounting.

HOWE, KEITH R., *Associate Professor*. DBA, Arizona State University, 1979. Managerial Accounting.

JACKSON, ROBERT, *Assistant Professor*. PhD, Brigham Young University, 1994. Information Systems.

LIDDLE, STEPHEN, W., *Assistant Professor*. PhD, Brigham Young University, 1995. Information Systems.

McKELL, LYNN J., *Professor*. PhD, Purdue University, 1973. Information Systems.

MESERVY, RAYMAN D., *Associate Professor*. PhD, University of Minnesota, 1985. Audit; Information Systems.

PALMER, GLEN O., *Assistant Professor*. MAcc, Brigham Young University, 1963. Tax.

PETERSON, FREDRIC G., *Assistant Professor*. PhD, University of Utah, 1973. Quantitative Methods.

PRAWITT, DOUGLAS F., *Assistant Professor*. PhD, University of Arizona, 1993. Audit Systems; Managerial Accounting.

RADEBAUGH, LEE HOWARD, *Professor*. DBA, Indiana University, Bloomington, 1973. International Business.

RANDALL, BOYD C., *Professor*. PhD, University of Minnesota, 1972. Tax.

ROMNEY, MARSHALL B., *Professor*. PhD, University of Texas, Austin, 1977. Audit; Systems Accounting.

SKOUSEN, K. FRED, *Professor*. PhD, University of Illinois, 1968. Financial Accounting.

SPIPKER, BRIAN C., *Assistant Professor*. PhD, University of Texas, Austin, 1993. Tax.

STEWART, DAVE NELSON, *Professor*. PhD, University of Florida, 1980. Tax.

STICE, JAMES D., *Associate Professor*. PhD, University of Washington, 1989. Financial Accounting.

STOCKS, KEVIN D., *Professor*. PhD, Oklahoma State University, 1981. Managerial Accounting; Information Systems.

STREULING, G. FRED, *Professor*. PhD, University of Iowa, 1971. Tax.

SWAIN, MONTE R., *Assistant Professor*. PhD, Michigan State University, 1991. Managerial Accounting.

WOODFIELD, LEON W., *Professor*. DBA, Michigan State University, 1965. Financial Accounting.

WORSHAM, RONALD, *Assistant Professor*. PhD, University of Florida, 1994. Tax.

AGRONOMY AND HORTICULTURE

Chair: Richard E. Terry
Graduate Coordinator: Laren R. Robison

289 WIDB
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 (801) 378-3825

THE PROGRAM OF STUDIES

Agronomy and Horticulture are two fundamental sciences concerned with feeding, clothing and beautifying the world. They are among the primary sciences associated with genetic engineering to improve the quality of life for humanity. The academic thrust of the department is to ground students firmly in the science of these two disciplines to qualify them for further graduate work or for employment in industry, government, or private enterprise.

The Department of Agronomy and Horticulture offers two degrees: Agronomy—MS and Horticulture—MS. The department also offers Molecular Biology—MS as an interdepartmental program.

Areas of specialization within the degrees: Crop Science, Soil Science, Horticulture, Developmental Agriculture.

There will usually be an average of eight graduate students pursuing the MS degree. The program is intended to be completed in two calendar years.

Agronomy, Horticulture, Molecular Biology—MS

Agronomy: Agronomy is the science that feeds the world. It is a composite title for issues associated with the major food crops, soils, environmental restoration, reclamation, genetic engineering, Third-World development, etc.

Horticulture: Horticulture is the science of fruit and vegetable production. These food products are finding greater essential use in our diet as scientific knowledge about human needs is defined. Horticulture also finds expression in the beauty of growing plants and in the floral art form.

Molecular Biology: The great discoveries and advances in genetic engineering and biotechnology began—and continue to be discovered and used—first in the crops we grow. This is a rapidly expanding area of study with great opportunity.

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, spring, February 1 and June 30 (U.S. and international).
- Entrance examination: GRE general test.
- Prerequisite:
Agronomy or Horticulture (MS): baccalaureate degree in agronomy or horticulture or related field.
Molecular Biology (MS): baccalaureate degree in molecular biology or biological or physical science, including one year of general university physics, mathematics equivalent to Math 113, one year of organic chemistry with laboratory, and one year of cell biology and genetics equivalent to Botny-Mcbio-Zool 341 and 342.

Requirements for Degree.

- Credit hours:
Thesis Option (30 hours): minimum 24 course work hours plus 6 thesis hours (AgHrt 699R).
Project Option (36 hours): minimum 30 course work hours plus 6 project hours (AgHrt 698R).
Molecular Biology: additional specific requirements of Chem 481, 582, 586; Stat 337 or 501; Mcbio 351, 425, 441, 442, and 642 or Zool 526.
- Thesis: completion of the thesis in scientific journal format (preferred) or in standard university format.
- Project: completion of a scholarly project report.

- Undergraduate hours: no more than 9 semester hours may be applied toward master's degree.
- Examinations: (A) final oral examination; (B) defense of thesis or project.
- Minor: not required; students desiring a minor may choose from botany, chemistry, computer science, food science, geology, geography, mathematics, microbiology, physics, statistics, range science, or zoology.

FINANCIAL ASSISTANCE

Financial assistance is available for these programs through the Department of Agronomy and Horticulture. The department has from four to seven assistantships. There are also funds for tuition offsets granted through the department from the Office of Graduate Studies. Other financial aid is available through the university.

RESOURCES AND OPPORTUNITIES

Agriculture Station. The station encompasses several sites, all of which support research in basic and applied agriculture. Station facilities include: an 837-acre farm in Spanish Fork, Utah, a few miles south of Provo, with 80 acres of orchards, crop research plots, a 440-cow dairy, a 60-head beef herd, and a 70-sow swine unit; the 9,388-acre BYU Skaggs Research Ranch near Malta, Idaho; and several livestock project areas in north Provo, among them the Ellsworth Meat and Livestock Center and poultry, sheep, and horse projects. At these facilities research can be conducted on soils and on field, forage, and horticultural crops.

Ezra Taft Benson Agriculture and Food Institute. The major objective of the institute is to raise the quality of life among the people of the world through improved nutrition and enlightened agricultural practices. Emphasis is placed on teaching and training students who wish to work in foreign countries and on training people from those countries in agriculture

and food science practices that can be used to improve life. Research to improve agricultural practices, family nutrition, and appropriate technology is encouraged.

M. L. Bean Life Science Museum. Exhibits and collections of biological specimens are housed in the M. L. Bean Life Science Museum. The exhibits include habitat studies of local as well as exotic plant and animal species and a large and valuable collection of trophies from North America, Africa, and Asia.

USDA Forest Service Shrub Science Laboratory. Housed on the BYU campus, this laboratory supports one of the finest research programs on native shrubs in the world. Here eleven PhD research scientists with adjunct faculty appointments work with BYU faculty members and graduate students. Laboratories, greenhouses, and gardens on campus and around the state support studies on desert shrubs.

Other Laboratory and Field Resources. On the Provo campus are an arboretum, a small animal vivarium, a tissue culture room, and several environmental chambers. Laboratory facilities include gas chromatographs-mass spectrometers, isotope ratio mass spectrometers, transmission and scanning electron microscopes, ultra centrifuges, visible ultraviolet and infrared spectrophotometers, gas chromatographs, high-performance liquid chromatographs, infrared gas analyzers, atomic absorption spectroscopy, and many other items. Besides excellent greenhouse facilities and environmental chambers, the department has an experimental research area at the BYU Agriculture Station and a horticulture study area where all-American vegetable and flower selections are grown.

Faculty and graduate students are currently engaged in a number of significant and interesting research projects, funded both internally and externally. Some of these are: mineral uptake by plants; ecology and seed physiology;

photosynthetic rate and water-use efficiency in plants; plant breeding and molecular genetics; forage research; and environmental science.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

501R. (AgHrt-AnSc-FSN) Village Agriculture and Nutrition in Latin America (1)

Prerequisite: experience in Latin America and/or in issues relative to the seminar.

Problems, successes, failures, and challenges facing those who work in agricultural research, training, and development related to small-scale farmers.

511. Soil Physics. (3)

Prerequisite: AgHrt 282, Chem 105, Math 113. Recommended: Phscs 121.

Physical relationships of water, heat, and gases in soils; physical and chemical properties of clays. Mathematical modeling of physical properties and transport processes.

514. Soil Microbiology. (3)

Prerequisite: Chem 106, 107, or equivalent.

Ecology and role of soil microorganisms in nutrient cycling, decomposition of organic matter and waste materials, and degradation of agricultural chemicals in soil.

520. Saline and Sodic Soils. (3)

Prerequisite: AgHrt 302, 305, Chem 105, 106, 107, or equivalent.

Physical and chemical properties of saline and sodic soils and waters—their diagnosis, reclamation, and management for crop production.

540. Crop Physiology. (3)

Prerequisite: AgHrt 460, Botny 440.

Plant-soil-climate relationships; crop management practices related to physiological processes in plants.

550. Developmental Plant Physiology (3)

Prerequisite: AgHrt 318, 320; Botny 440 or equivalent.

Developmental phenomena in higher plants, emphasizing seed physiology, plant growth regulation, and plant stress responses.

559. (AgHrt-Botny) Advanced Plant Breeding. (2)

Prerequisite: AgHrt 459 or equivalent, Botny 341.

Techniques in molecular genetics and their application to plant breeding.

560. Soil and Plant Analysis. (3)

Prerequisite: AgHrt 305 or Chem 223.

Laboratory chemical analysis of soils and plant materials in soil and plant research.

595. Agricultural Experimentation: Design and Analysis. (2)

Prerequisite: Stat 501 or equivalent.

Planning, experimental design, and techniques of analysis in agriculture.

598R. Advanced Topics. (1-2)

Prerequisite: instructor's consent.

Advanced study of selected agricultural topics.

605. Soil-Plant Relationships. (3)

Prerequisite: AgHrt 282, 305; Botny 440; organic or biochemistry course.

Soil-plant nutrition including mechanisms of nutrient uptake, transfer, and assimilation; mechanisms of nutrient immobilization and toxicity in soils and plants.

694R. Seminar. (1)

697R. Research. (1-9)

698R. Master's Project. (1-6)

For project option only.

699R. Master's Thesis. (1-9)

FACULTY

ALLEN, PHIL S., *Assistant Professor*. PhD, University of Minnesota, 1990. Seed Physiology; Ornamental Horticulture; Seed Physiology.

ELLSWORTH, D. DELOS, *Associate Professor*. MS, Cornell University, 1959. Real Estate Appraisal and Analysis.

HORROCKS, R. DWAIN, *Professor*. PhD, Pennsylvania State University, 1967. Crop Physiology; Ecological Modeling; Forage Production and Utilization.

JEFFERY, LARRY S., *Professor*. PhD, North Dakota State University, 1966. Physiology of Weed Growth and Competition.

JOLLEY, VON D., *Professor*. PhD, Iowa State University of Science and Technology, 1976. Mineral Nutrition in Plants; Chemistry of Iron Uptake in Plants.

NELSON, SHELDON D., *Professor*. PhD, University of California, 1971. Soil Physics; Irrigation Management; Herbicide Degradation in Soils.

ROBISON, LAREN R., *Professor*. PhD, University of Minnesota, 1962. Plant Genetics; DNA Analysis of New Crop Species; Agriculture Development.

STEVENS, MIKEL R., *Assistant Professor*. PhD, University of Arkansas, 1993. Plant Breeding; Molecular Genetics.

TERRY, RICHARD E., *Professor*. PhD, Purdue University, 1976. Soil Microbiology; Reclamation and Restoration of Environmentally Disturbed Sites.

WILLIAMS, C. FRANK, *Professor*. PhD, Oregon State University, 1971. Plant Propagation; Turf Management; Organic Materials Recycling; Water Quality.

ANIMAL SCIENCE

Chair: Richard N. Thwaites
Graduate Coordinator: Richard O. Kellems

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THE PROGRAM OF STUDIES

The Animal Science Graduate Program is designed to train students in the following areas: breeding and genetics, meat and muscle biology, molecular biology, reproduction, monogastric and ruminant nutrition, management, and international production.

The master of science (MS) degree in animal science is designed to prepare a student to pursue a PhD degree or provide the student with additional technical skills beyond the BS degree to be successful as a livestock operation manager or as a scientist involved with technical support or international livestock production.

The Animal Science Department offers one degree: Animal Science—MS. The department also offers Molecular Biology—MS as an interdepartmental program.

Areas of specialization within the animal science degree: Genetics, Nutrition, Reproduction, Management, Meats, Animal Health.

Animal Science, Molecular Biology—MS

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, spring, February 1 (U.S. and international).
- Entrance examinations: GRE general test and the general animal science exam.
- Prerequisite: for animal science, baccalaureate degree in animal science or in a closely related field. For

molecular biology, baccalaureate degree in molecular biology, physical science, biological science, or animal science. This would include one year of general university physics, mathematics equivalent to Math 119 or 113, one year of biochemistry with laboratory, and one year of cell biology and genetics equivalent.

Requirements for Degree

- Credit hours:
Thesis Option (30 hours): minimum 24 course work hours plus 6 thesis hours (AnSc 699R).
Project Option (36 hours): minimum 30 course work hours plus 6 project hours (AnSc 698R).
- Thesis (required for thesis option): completion of the thesis in standard university format or in scientific journal format.
- Project (required for project option): completion of a scholarly project report.
- Required courses:
Animal Science: AnSc 507, 510, or 574, 692R (each semester of residence); Stat 501; Zool 503; plus additional elective courses as required by the student's graduate committee.
Molecular Biology Emphasis: Chem 481, 582, 586; Stat 501; and two of AnSc 507, 510, or 574 plus additional elective courses as required by the student's graduate committee. Students may be required to take other undergraduate-level molecular biology courses if they have not completed the courses as part of their BS degree program. Check with the departmental molecular biology coordinator.
- Examinations: (A) written and oral examination on course work; (B) oral defense of thesis.
- Minor (optional): agronomy, horticulture, botany, chemistry, computer science, food science and nutrition, microbiology, statistics, or zoology (emphases in agribusiness and animal science are available).

FINANCIAL ASSISTANCE

Teaching and research assistantships are offered on a competitive basis by the department.

RESOURCES AND OPPORTUNITIES

Agriculture Station. The station encompasses several sites, all of which support research in basic and applied agriculture. Station facilities in Spanish Fork include a 793-acre farm, a 425-cow dairy, a 60-head beef herd, and a 70-sow swine unit. The 9,228-acre BYU Skaggs Research Ranch is located in Malta, Idaho, and consists of a cropping operation, beef cow operation, and feedlot. Campus livestock facilities consist of the Ellsworth Meat Laboratory and horse, poultry, and sheep units.

Ellsworth Meats Laboratory.

Equipped for performing chemical, microbiological, and meat tenderness analyses, the laboratory researches aspects of meat emulsions and cured meat quality, among other things.

Molecular Laboratory. Protein and DNA isolation, separation, and characterization facilities for vaccine development and working with pathogenic organisms at the class 2 level are available, as is equipment for the production of transgenic embryos.

Nutrition Facilities. Facilities are available for conducting metabolism trials (sheep, poultry, rabbits) as well as a well-equipped nutrition laboratory for evaluating feed and biological samples.

Reproduction Laboratories. Laboratories are located on campus and at the BYU Agriculture Station for conducting basic and applied research. These labs are equipped to handle sample collection and processing, radioisotopes, chemical and biological analyses, small and large animal surgery, embryo manipulation and culturing, and tissue and cell culture. Diagnostic imaging, ultrasound, and surgical facilities are available.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

501R. (AgHrt-AnSc-FSN) Village Agriculture and Nutrition in Latin America (1)

Prerequisite: experience in Latin America and/or in issues relative to the seminar.

Problems, successes, failures, and challenges facing those who work in agricultural research, training, and development related to small-scale farmers.

507. Advanced Animal Nutrition. (4)

Prerequisite: AnSc 207; Chem 152, 181.

Functions of nutrients in metabolism; methods for assessing nutrient utilization and requirements.

510. Advanced Reproductive Physiology. (4)

Prerequisite: AnSc 310.

Molecular, biochemical, and hormonal regulation of processes controlling reproduction in mammalian species.

520. Case Studies in Animal Production. (3)

Prerequisite: BS in animal science with agribusiness emphasis.

Case studies that require students to solve problems in animal production dealing with nutrition, reproduction, genetics, health, and product processing.

525. Case Studies in International Animal Production. (3)

Prerequisite: BS in animal science with agribusiness emphasis.

Case studies in international animal production on both village and large-scale farms dealing with nutrition, reproduction, genetics, health, and product processing.

530. Management of National Animal Industries. (2)

Prerequisite: BS in animal science with agribusiness emphasis.

Incorporation of accounting, finance, marketing, and human relations principles with animal science principles in solving managerial problems in animal industries.

535. Management of International Animal Industries. (2)

Prerequisite: BS in animal science with agribusiness emphasis.

Incorporation of accounting, finance, marketing, and human relations principles with animal science principles in solving managerial problems in international animal industries.

574. (AnSc-Botny) Introduction to Population Genetics. (3)

Prerequisite: introductory courses in genetics and statistics.

Quantitative study of factors influencing changes in gene frequencies in natural and domestic animal and plant populations.

591R. Selected Topics in Animal Science. (0.5-3)

Prerequisite: instructor's consent.

595R. Special Problems in Animal Science. (0.5-2)

Prerequisite: instructor's consent.

599R. Cooperative Education. (2-9)

Prerequisite: department's or cooperative education coordinator's consent.

On-the-job experience in livestock or meat production practices, veterinary medicine, or research. On- or off-campus opportunities.

692R. Seminar. (1)**698R. Master's Project. (1-9)****699R. Master's Thesis. (1-9)**

FACULTY

JOHNSTON, N. PAUL, *Professor*. PhD, Oregon State University, 1971. Nutrition, Poultry and Small Animal; Reproduction and Light Interaction Poultry.

KELLEMS, RICHARD O., *Associate Professor*. PhD, Oregon State University, 1976. Ruminant Nutrition; Alternative Feedstuff Development and Evaluation; Nutrient Utilization.

KNOWLES, JOHN E., *Assistant Professor*. DVM, Colorado State University, 1991. Animal Health; Reproductive Physiology and Equine Medicine.

ORME, LEON E., *Professor*. PhD, Michigan State University, 1958. Growth and Body Composition; Livestock Evaluation and Selection.

PARK, ROBERT L., *Professor*. PhD, Cornell University, 1962. Animal Breeding and Genetics; Molecular Genetics; Swine and Livestock Production.

ROEDER, BEVERLY L., *Associate Professor*. DVM, Ohio State University, 1982; PhD, Pennsylvania State University, 1990. Anatomy; Physiology; Medicine and Surgery; Animal Health; Prevention and Diagnoses of Metabolic Disorders.

SILCOX, ROY W., *Assistant Professor*. PhD, North Carolina State University, 1986. Reproductive Physiology; Management; Regulation of Ovulation; Superovulation; Embryonic Development.

THWAITS, RICHARD N., *Associate Professor*. DVM, Colorado State University, 1981; PhD, University of Georgia, 1991. Anatomy; Veterinary Technology; Molecular Biology; Medicine and Surgery; Physiology.

WALLENTINE, MAX V., *Professor*. PhD, Cornell University, 1960. Meat Science; Sheep and Livestock Production.

ANTHROPOLOGY

Chair: John P. Hawkins

Graduate Coordinator: David J. Johnson

945 SWKT

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THE PROGRAM OF STUDIES

The graduate program in anthropology emphasizes archaeology. Focusing on the emergence of complex societies, simple farmers and hunter-gatherers, and historic archaeology, the program's strength is the diversity of research opportunities it affords students, especially in Mesoamerica and the Great Basin/Southwest regions of North America.

Annual field schools in historic and prehistoric archaeology provide training in resolving field problems. The department's geographical specialties in archaeology are the Intermountain West (which verges into the southwestern cultural area in southern Utah), Mexico, Guatemala, and the Middle East. The university conducts field research in each of those areas, and qualified students may participate. Also, historic site excavations in Utah, Illinois, and New York have given students experience at mining, military, village, and LDS Church history sites.

Rather than emphasize specialized or topical interests, however, the program equips the graduate with the basics of professional anthropology: a broad and versatile perspective and the ability to (1) define a research problem, (2) choose tools wisely for approaching it, (3) gather and analyze data efficiently and creatively, and then (4) communicate results and recommendations effectively.

One degree is offered through the Department of Anthropology: Anthropology—MA. An anthropology minor is also available to students enrolled in

other graduate programs. From three to five students enter the program each year, and most take three years to complete the requirements. The number of students in the program varies between ten and fifteen.

Anthropology—MA

The aim of this program is to prepare students (1) for productive employment at a junior professional level upon receiving an MA degree or (2) for entry into PhD programs in anthropology elsewhere.

Only a broad discussion of requirements is provided here. The department sends each prospective graduate student the "Graduate Program Description," a detailed, step-by-step outline of expectations, requirements, and guidelines for progress through the program. The student must return a form indicating that he or she has read the detailed guidelines, understands them, and agrees to be governed by them. This is done because requirements sometimes change slightly in the interval between submission of catalog copy and publication of the finished catalog. By writing, calling, or visiting the department, prospective students will receive the most up-to-date and appropriate information.

Admission and Entry.

- Semesters of entry and application deadlines: fall, March 1 (U.S. and international); winter, March 1 (U.S. and international).
- Application requirements: submission of a letter of intent that specifies particular areas of interest. This letter will provide the basis for assignment of a temporary faculty advisor, who will work with the applicant until a thesis committee is organized.
- Entrance examination: GRE general test score should be entered on line 11 of part D of the application form. Foreign students who do not have English as a native language must take the TOEFL exam and submit the score (577 minimum) with the application.

- Prerequisite: undergraduate degree in anthropology. If a student's bachelor's degree is not in anthropology, the student may be admitted provisionally while completing appropriate background course work.

Requirements for Degree.

- Credit hours (33): minimum 27 hours plus 6 thesis hours (Anthr 699R); minimum 20 hours under direct instruction of professional anthropologists at BYU or in another acceptable department. Thesis, reading, internship, and individual work do not count toward these 20 hours.
- Required core courses: Anthr 505, 534; 550 or 551; 590, 605, 615, 699R.
- Additional courses: 9 hours from Anthr 621–629, 672, 690R; electives.
- Thesis.
- Examinations: (A) written comprehensive examination at or near completion of required courses and before undertaking serious work on thesis; (B) oral defense of thesis.
- Committee: each student identifies two faculty members and obtains their consent to serve on his or her graduate committee. One of them will become chair of the student's graduate committee, and the other will serve on it. The committee and the student agree on a curriculum plan in accordance with the "Graduate Program Description."

Anthropology—Minor

A minor in anthropology can add a cross-cultural perspective, useful for people with international or multicultural interests in the following majors or fields of interest: nutrition, education (either elementary or secondary), educational leadership, counseling, international and area studies, psychology, social work, sociology, art, communications, theatre and film, language, business administration, public administration, applied economics, family sciences, marriage and family therapy, geography, or history. The minor requires a minimum 15 hours. See department for specific requirements.

FINANCIAL ASSISTANCE

The Department of Anthropology offers tuition assistance to all incoming graduate students.

Additional support comes through assistantships, grants, and employment offered by the department and the Museum of Peoples and Cultures, but the funds are limited. The goal is to provide some support for many students rather than generously support a few. The department is currently developing special scholarships, work study, and project support programs for Native American students interested in careers in anthropology and museology. This is being done with the assistance of Multicultural Student Services at BYU.

The Office of Public Archaeology in the museum regularly gives employment and experience to students prepared to participate in contract archaeology projects.

RESOURCES AND OPPORTUNITIES

Museum of Peoples and Cultures.

Closely associated with the Anthropology Department, the Museum of Peoples and Cultures offers unique research opportunities for students and faculty, several of whom have research offices in the museum. Located south and west of campus in Allen Hall, the museum holds a number of important archaeological and ethnographic collections that have not been systematically analyzed and reported. These collections, which represent Utah Valley, the American Southwest, and Mesoamerica, as well as other parts of the world, provide material for thesis topics, professional publications, and academic credit. Research entities in the museum include the Archaeological Technical Laboratory, which specializes in botanical and minerals analysis, and the Office of Public Archaeology, one of the most active archaeological contracting organizations in the intermountain area.

The New World Archaeological

Foundation. This foundation is a re-

search institution focused on formative Mesoamerican civilizations, especially in Chiapas, Mexico. Established in 1952, the NWAf maintains a staff and research facilities in San Cristobol, Chiapas. The NWAf publishes a monograph series (papers) as well as notes to disseminate research findings. Graduate student opportunities through the foundation include laboratory research on campus and limited field work in Mexico.

Joseph Fielding Smith Institute for Church History. The institute's purpose is to study the Latter-day Saint past. Its personnel are historians whose primary work is writing and publishing for professional and general Church audiences. The institute also seeks to facilitate the research of other Church history scholars by providing limited support for research and publication.

Charles Redd Center for Western Studies. Established in 1972 under an endowment from Charles Redd, a prominent Utah stockman and philanthropist, the center is charged with promoting the study of all aspects of the American West. The center publishes a monograph series, assists faculty and student research through grants and fellowships, and sponsors lectureships each year.

Jerusalem Center for Near Eastern Studies. On Mount Scopus, overlooking the Holy City, BYU's newly completed Jerusalem Center for Near Eastern Studies provides extraordinary educational opportunities for students and scholars. A seven-tiered, 120,000-square-foot structure, the center houses an extensive learning resource area, classrooms, dormitories, galleries, exhibits, a library, and auditoriums. Scholars and visitors from other universities, as well as students enrolled in its academic programs, are served here. The center's library, for example, offers a selected collection of contemporary Holy Land readings, rare books, special collections, and accessible computer data. For information concerning opportunities for graduate study in Jerusalem, call or

write Paul Y. Hoskisson, chair of Near Eastern Studies (211 HRCB). BYU Travel Study information can be obtained from the director of the Jerusalem Center.

Examples of current faculty and graduate student research include: socio-political complexity in Chiapas and Guatemala; development of complex society among the Maya; hunter-gatherer ecology in the eastern Great Basin; historic economies and settlements of the western frontier and Utah.

For a more detailed description of the graduate program requirements, send for a copy of the department's Graduate Program Description.

COURSE DESCRIPTIONS

505. Anthropological Theory. (3)

Prerequisite: 30 hours of anthropological courses including Anthr 205, 305, 405.

Major contributions to the development of anthropological theory, circa 1970 to the present.

510. History of Archaeology. (3)

Historical approach to the development of archaeological knowledge, method, and theory; emphases on North America and individual contribution.

515. Settlement, Trade, and Urbanism: Understanding the Ancient Landscape. (3)

Prerequisite: 30 hours of undergraduate anthropology courses.

Comparative study of the beginnings of settled life, systems of exchange, and city life. Special attention to theory as applied to evidence from the new and old worlds.

520. Economic Anthropology. (3)

Prerequisite: 30 hours of undergraduate anthropology courses, including Anthr 205, 305, 405.

Social context of production, distribution, and consumption in nonindustrial societies; technology; exchange and redistribution of resources. Currency, property rights, capital, recruitment, and rewards of labor.

530. Great Basin Archaeology. (3)

Overview of ethnography, history of research, and prehistory of the southwestern United States and northern Mexico. Current issues also emphasized.

534. Social Anthropology. (3)

Political, economic, and social institutions in cultural systems, emphasizing issues.

535. Southwest Seminar. (3)

Current issues in archaeological research in the American Southwest.

537R. Communication and Culture. (3)

Course designed for higher-level work load while attending Anthr 309.

540. Issues in Historic Archaeology. (3)

In-depth review of issues, trends, and methods of historic archaeology.

550. (Anthr-Ling) Sociolinguistics. (3)

Research and theory in anthropological linguistics and sociolinguistics.

551. (Anthr-Ling) Anthropological Linguistics. (3)

Language in culture and society: development, typology, and description.

562. Formative Mesoamerica. (3)

Prerequisite: 30 hours of undergraduate courses, including Anthr 355.

Topics and issues concerning beginnings and development of Mesoamerican civilizations. Mexican and preclassic Mayan antecedents of classic Mayan civilization and culture.

564. Classic Mayan Civilization. (3)

Prerequisite: 30 hours of undergraduate anthropology courses, including Anthr 355.

Topics and issues concerning archaeological and cultural aspects of classic Mayan civilization and society.

566. Mayan Ethnohistory. (3)

Prerequisite: 30 hours of undergraduate anthropology courses, including Anthr 355.

Topics and issues of cultural change, colonization, and documentation of change processes in the Mayan region, from the postclassic period and independence from Spain.

568. Modern Mayan Society. (3)

Prerequisite: 30 hours of undergraduate anthropology courses, including Anthr 326.

Advanced analysis of cultural process issues among the Maya, from their independence from Spain to the present.

572. Ancient Mayan Writing 1. (3)

Nature and content of Mayan hieroglyphic writing, from AD 100 to 1600. Methods of decipherment, introduction to textual analysis, and application to interpreting Mayan language, art, world view, and society. Explorations of literacy and the Mesoamerican background of Mayan script.

574. Ancient Mayan Writing 2. (3)

Prerequisite: Anthr 372 or 572.

Advanced study of Mayan hieroglyphic writing. Guided workshop with focus on inscriptions, rituals, dynastic history, and linguistic records from major Mayan cities. Emphasis on archaeological setting and preparation of technical commentaries.

575. Writing Systems. (3)

Prerequisite: 30 hours of undergraduate anthropology courses.

Comparative study of writing around the world, with special emphasis on ancient scripts. Topics include: linguistic concepts; social, political, and economic function of early script; ancient literacy; development and extinction of script.

580. Near East Seminar. (3)

Prerequisite: 30 hours of undergraduate anthropology courses.

Current issues in Near Eastern archaeological research.

585. Current Issues in African Ethnography. (3)

Prerequisite: Anthr 330 or instructor's consent.

Current anthropological issues: the rise of markets and labor systems; statism and nationalism; change in domestic life; globalization of African culture; tradition amidst change.

590R. Seminar. (2-3)

Special topics in archaeology.

596R. Museum Projects. (3)

Prerequisite: Anthr 475 or equivalent; instructor's consent.

Students supervised in one or more museum projects, such as producing an exhibition, developing educational materials, and accessing collections.

599. Federal Agency Internship. (1-6)

Earning credit while employed in federal agency archaeology. Agencies include the BLM and U.S. Forest Service.

605. Archaeological Method and Theory. (3)

Current theoretical and methodological trends and developments in archaeological research.

625R. Issues in Mesoamerican Prehistory. (3)

Current issues in archaeological research in Mesoamerica.

655R. Field School Supervision. (2)**672. Special Scientific Techniques for Archaeology. (3)**

Dating and analytical techniques using methods of chemistry, physics, etc.

694R. Readings. (1-3)

Prerequisite: supervising instructor's consent.

Reading about 1,000 pages per credit hour and providing required products.

695R. Research. (1-6)

Prerequisite: completion of 18 hours of 500-level core curriculum for MA program.

Field research, data acquisition, and data analysis. Must be thesis related.

699R. Master's Thesis. (1-9)**FACULTY**

BERGE, DALE L., *Professor*. PhD, University of Arizona, 1968. Historical Archaeology.

CLARK, JOHN E., *Assistant Professor*. PhD, University of Michigan, 1994. Archaeology; Political and Economic Institutions; Cultural Evolution.

CRANDALL, DAVID P., *Assistant Professor*. DPhil, Oxford University, 1993. Social Anthropology; South Africa; Kinship, Ritual, and Symbols.

FORSYTH, DONALD W., *Professor*. PhD, University of Pennsylvania, 1979. Archaeology; Ceramic Analysis; Ethnohistory.

HAWKINS, JOHN P., *Professor*. PhD, University of Chicago, 1978. Social Anthropology; Ethnicity; Kinship and Family.

HOUSTON, STEVEN D., *Associate Professor*. PhD, Yale University, 1987. Archaeology; Mayan Writing Systems; Complex Societies.

JANETSKI, JOEL C., *Associate Professor*. PhD, University of Utah, 1983. Archaeology; Ethnohistory; Hunter-Gatherer Studies.

JOHNSON, DAVID J., *Associate Professor*. PhD, University of Utah, 1987. Archaeology; Archeometry; Ancient Trade, Near East.

MATHENY, RAY T., *Professor*. PhD, University of Oregon, 1968. Archaeology; Ceramic Typology; Mesoamerica.

ART

See Visual Arts.

ASIAN AND NEAR EASTERN LANGUAGES

Chair: Van C. Gessel

Graduate Coordinator: Dana S. Bourgerie

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THE PROGRAM OF STUDIES

One degree is offered through the Department of Asian and Near Eastern Languages: Language Acquisition (Arabic, Chinese, Japanese, or Korean)—MA. This is a collegewide program. Generally not more than two students per language are admitted each year to the acquisition program. The program is designed so that a student can complete the degree in four semesters if he or she enters with the appropriate background (see below).

Language Acquisition (Arabic, Chinese, Japanese, or Korean)—MA

This program offers professional preparation to students seeking careers in applied linguistics, foreign language education, computer-assisted language learning and instruction, and other related areas.

Students become familiar with current theories of second-language acquisition and develop basic skills in applying that knowledge to teaching, testing, and classroom-oriented research in their language of specialization.

The program is quite flexible, with emphases varying according to students' interests and faculty members' expertise. It is ideally suited to the needs of the following types of students:

- Students who have completed undergraduate majors in foreign lan-

- guages, applied linguistics, or related fields, and who are contemplating eventual careers in academics.
- Foreign language teachers at the secondary school level who wish to further their professional education and acquire more specialized competency in their fields.
 - Students seeking the necessary preparation for advanced research and work in the field of high technology applications to language learning and instruction.

Although the nature of the program is applied, the Department of Asian and Near Eastern Languages offers a broad range of supporting courses in modern and classical culture and literature within the various language groups.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination (general test) and a fifteen-minute interview in the language of specialization addressing applicant's academic goals. The interview may be completed in person, by telephone, or on tape in conversation with a second party.
- Prerequisite: baccalaureate degree and strong background in the language of specialization. A basic linguistics background is helpful.

Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours (699R).
- Required courses: Ling 540, 600, 641, 660, 677.
- Elective courses (12 hours): advanced linguistic study of the language of specialization (3 hours), plus 9 hours as approved by the graduate committee.
- Language requirement: reading and speaking ability (202 level) in language other than English in addition to language of specialization.
- Thesis: 6 hours of 699R in language of specialization.
- Examination: oral defense of thesis.

FINANCIAL ASSISTANCE

Full or partial tuition assistance is available, depending on merit. According to department needs, students may also have opportunities to serve as research or teaching assistants to help finance their studies and to gain practical experience.

RESOURCES AND OPPORTUNITIES

The Department of Asian and Near Eastern Languages utilizes the **Humanities Research Center** for world-class computer-assisted language instruction and translation. Other resources are:

The Foreign Language Student Residence. Students who desire a more intensive language study experience and practical application of the language under the direction of faculty and native residents may apply to live in the Foreign Language Student Residence. All activities in the individual apartments in the residence are conducted in the foreign language. Housing is available for men and women in Japanese, Chinese, Arabic, and Korean languages. Graduate students may participate as students or as senior residents.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

Chinese (Mandarin)

599R. Cooperative Education: Internship. (9)

Prerequisite: Chin 301.

On-the-job cultural and/or language experience.

670R. Tutorial Internship in Chinese. (1-3)

Individual research in cooperation with graduate faculty member in problems relating to Chinese literature and language. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Chinese. (1-3)

Individual study supervised by graduate faculty member in varying topics of specific interest in Chinese literature and language.

690R. Seminar in Chinese. (1-3)

Group studies supervised by graduate faculty member in varying topics of specific interest in Chinese literature and language.

699R. Master's Thesis. (1-6)

Japanese

599R. Cooperative Education: Internship. (9)

Prerequisite: Japan 301.

On-the-job cultural and/or language experience.

670R. Tutorial Internship in Japanese. (1-3)

Individual research in cooperation with graduate faculty member in problems relating to Japanese literature and language. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Japanese. (1-3)

Individual study supervised by graduate faculty member in varying topics of specific interest in Japanese literature and language.

690R. Seminar in Japanese. (1-3)

Group studies supervised by graduate faculty member in varying topics of specific interest in Japanese literature and language.

699R. Master's Thesis. (1-6)

Korean

599R. Cooperative Education: Internship. (9)

Prerequisite: coordinator's consent and departmental approval.

On-the-job cultural and/or language experience. Students must meet departmental requirements and consult coordinator before enrollment. Report required.

670R. Tutorial Internship in Korean. (1-3)

Individual research in cooperation with graduate faculty member in problems relating to Korean literature and language. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Korean. (1-3)

Individual study supervised by graduate faculty member in varying topics of specific interest in Korean literature and language.

690R. Seminar in Korean. (1-3)

Group studies supervised by graduate faculty member in varying topics of specific interest in Korean literature and language.

699R. Master's Thesis. (1-6)

Linguistics

(See Linguistics section of this catalog for courses.)

Near Eastern Languages and Literature

Ancient: Akkadian, Aramaic, Coptic, Egyptian, Syriac, and Ugaritic Courses

511R. Studies in Ancient Near Eastern Languages. (2-4) On dem.
Grammar and reading skills.

521R. Special Topics in Ancient Near Eastern Literature. (2-3) On dem.
Historical and comparative studies of ancient Near Eastern literature.

Arabic

531R. Advanced Topics in Arabic. (3) On dem.

Prerequisite: instructor's consent.

Advanced studies in Arabic language and literature.

670R. Tutorial Internship in Arabic. (1-3) On dem.

Individual research in cooperation with graduate faculty member in problems relating to Arabic literature and language. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Arabic. (1-3) On dem.

Individual study supervised by graduate faculty member in varying topics of specific interest in Arabic literature and language.

690R. Seminar in Arabic. (1-3) On dem.

Group studies supervised by graduate faculty member in varying topics of specific interest in Arabic literature and language.

699R. Master's Thesis. (1-6) On dem.

Hebrew

531R. Studies in Hebrew. (1-3)

Prerequisite: Heb 331.

FACULTY

BELNAP, R. KIRK, *Assistant Professor*. PhD, University of Pennsylvania, 1991. Arabic Language and Linguistics.

BOURGERIE, DANA S., *Assistant Professor*. PhD, Ohio State University, 1990. Chinese Linguistics: Dialect Studies and Sociolinguistics.

CHRISTENSEN, MATTHEW B., *Assistant Professor*. PhD, Ohio State University, 1994. Chinese Language and Linguistics; Curriculum Development.

GESSEL, VAN C., *Professor*. PhD, Columbia University, 1979. Japanese Language and Literature.

HONEY, DAVID B., *Associate Professor*. PhD, University of California, Berkeley, 1988. Classical Chinese Language and Literature.

KIM, HAN KON, *Professor*. PhD, Seoul National University, Korea, 1975. Korean Linguistics; Natural Language Processing and Computer-Assisted Language Learning.

MILLER, J. SCOTT, *Associate Professor*. PhD, Princeton University, 1988. Japanese Language and Literature.

PARKINSON, DILWORTH B., *Professor*. PhD, University of Michigan, 1982. Sociolinguistics; Arabic.

PARRY, DONALD W., *Assistant Professor*. PhD, University of Utah, 1992. Modern and Biblical Hebrew.

PERKINS, GEORGE W., *Assistant Professor*. PhD, University OF Utah, 1992. Modern and Biblical Hebrew.

PETERSON, DANIEL C., *Associate Professor*. PhD, University of California, Los Angeles, 1990. Medieval Islamic Philosophy; Arabic Language and Literature.

PETERSON, MARK A., *Associate Professor*. PhD, Harvard University, 1987. Korean Language and History.

RICKS, STEPHEN DAVID, *Professor*. PhD, University of California, Berkeley, 1982. Hebrew; Near Eastern Languages, History of Religions.

RUSSELL, ROBERT A., *Associate Professor*. PhD, Harvard University, 1977. Second Language Acquisition; Computer-Assisted Instruction.

WATABE, MASAKAZU, *Associate Professor*. PhD, University of Southern California, 1978. Linguistics; Japanese.

WILLIAMS, GARY S., *Associate Professor*. PhD, University of Washington, 1973. Chinese Language and Literature.

BOTANY AND RANGE SCIENCE

Chair: Wilford M. Hess

Graduate Coordinator: Kimball T. Harper

489 WIDB
PO Box 25181
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(801) 378-2129

THE PROGRAM OF STUDIES

Plants play a crucial role in the maintenance of life on this planet. Graduate students in the Department of Botany and Range Science pursue research in the general areas of plant classification (primarily seed plants, algae, and lichens), genetics (molecular emphasis), physiology, ecology, wildlife biology, biological education, and wildland management. Directed by a faculty of seventeen, graduate programs are focused on the biota of the Intermountain West. Students are expected to become familiar with modern theory, tools, and procedures to understand, manage, and conserve the earth's natural resources.

Because BYU is situated near the interfacing of several major biotic provinces and in a region of complex geology and topography, graduate students are surrounded by great biotic richness and ecological diversity. In addition to ready access to a rich variety of natural environments, graduate research is supported by modern laboratory facilities for molecular, ultra-structure, physiological, and genetic studies; an excellent library; controlled environment growth-chambers; a large and well-curated herbarium; and access to well-equipped field stations in the Great Basin Desert, mixed conifer montane forest, sagebrush-grass steppe, and northern Mojave Desert of southwestern Utah. The Shrub Sciences Laboratory of the Intermountain Research Station, U.S. Forest Service, which is located on campus, also strengthens graduate work in the department.

The Department of Botany and Range Sciences offers six degrees: Biological Science Education—MS, Botany—MS, Range Science—MS, Wildlife and Range Resources—MS, Botany—PhD, and Wildlife and Range Resources—PhD. The department also offers two interdepartmental programs: Molecular Biology—MS and Molecular Biology—PhD.

Areas of specialization within the MS degrees: Biological Science Education, Biotechnology, Botany, Conservation Biology, Genetics, Natural Resource Development, Range Science, Wildlife and Range Resources. PhD specializations: Biotechnology, Botany, Genetics, Wildlife and Range Resources.

An average of about forty graduate students pursue degrees in botany and range science at any one time. The ratio of master to PhD students is usually near four to one. Students in master's degree programs graduate in twelve to twenty-four months. PhD students are expected to graduate within thirty-six months after first enrollment. Students involved in field research are advised to commence graduate programs spring term, since much of the necessary research can be completed prior to commencing formal course work fall semester. Such students must coordinate plans carefully with their graduate committee.

Biological Science Education, Botany, Molecular Biology, Range Science, Wildlife and Range Resources—MS

The biological sciences education degree is designed to prepare students with advanced skills and knowledge for teaching in high schools and colleges. Students opting for this degree may pursue original research or library synthesis projects and present results in either formal thesis or project format. Students selecting programs in botany, molecular biology, range science, or wildlife and range resources will pursue original research topics and present a formal thesis. Since all research for these degrees is expected to be of publication quality,

theses are usually prepared in a form suitable for immediate submission for review by an appropriate scholarly journal.

Admission and Entry.

- Semesters of entry and application deadlines: fall and spring, February 20 (U.S. and international); winter, June 30 (U.S. and international).
- Entrance examinations: GRE general test, advanced biology subject test, and oral diagnostic examination. Foreign students must submit TOEFL scores.
- Prerequisite:
Biological Science Education or Botany Program Applicants: baccalaureate degree in botany or equivalent.
Molecular Biology Program Applicants: baccalaureate degree in molecular biology or biological or physical science. (This would include one year of general university physics, mathematics equivalent to Math 113, one year of organic chemistry with laboratory, and one year of cell biology and genetics equivalent to Botny-Mcbio-Zool 341 and 342.)
Range Science or Wildlife and Range Resources Program Applicants: baccalaureate degree in range, wildlife, or equivalent.

Requirements for Degree.

- Credit hours (30 minimum): 24 approved course work hours plus 6 project (Botny 698R) or 6 thesis hours (Botny 699R or Range 699R). Molecular biology includes additional specific requirements: Chem 367, 481, 582, 586; Stat 337 or 501; Mcbio 401, 425, 441, 442; 642 or Zool 526.
- Required course: Botny 691R or Range 691R (each semester of residence).
- Thesis or project: standard university thesis format or journal publication format. Project format must satisfy committee requirements.
- Examinations: (A) defense of research design; (B) oral examination on course work.
- Oral defense of thesis or project.

Botany, Molecular Biology, Wildlife and Range Resources—PhD

Candidates for the PhD may choose research topics in molecular plant genetics or aspects of plant physiology or biotechnology problems. Those seeking the PhD in wildlife and range resources may select research topics in plant or wildlife ecology, ecological physiology, restoration ecology in semiarid environments, secondary plant product-herbivore interactions, or plant systematics. All programs emphasize application of theory to practical problems.

Admission and Entry.

- Semesters of entry and application deadlines: fall and spring, February 20 (U.S. and international); winter, June 30 (U.S. and international)
- Entrance examinations: GRE general test, GRE advanced biology subject test, and oral diagnostic examination. Foreign students must submit TOEFL scores.
- Prerequisite: master's degree in field or equivalent.

Requirements for Degree.

- Credit hours (42 minimum): 24 course work hours beyond the master's degree plus 18 hours of dissertation (Botny 799R or Range 799R). **Note:** Individuals with an MS at BYU who wish to obtain a PhD here must go elsewhere for one year (30 semester hours).
- Required course: Botny 691R or Range 691R (each semester of residence).
- Skill requirement: includes 21 hours in skill subject area of foreign languages, mathematics, statistics, geography, and/or computer science. Consult graduate coordinator for details.
- Dissertation: standard university dissertation format or journal publication format.
- Examinations: (A) defense of research design; (B) comprehensive written and oral examinations on completion of skill requirement and course work.
- Oral defense of dissertation.

FINANCIAL ASSISTANCE

Financial assistance is available for these programs through the Department of Botany and Range Science. Other financial aid is available through the university. Financial assistance is available for superior students in the form of teaching assistantships, research assistantships, internships, and competitive scholarships. Contact graduate coordinator for specific information concerning possibilities for support.

RESOURCES AND OPPORTUNITIES

BYU Agriculture Station. The station encompasses several sites, all of which support research in basic and applied agriculture. At these facilities, research can be conducted on physiology and reproduction, health, and nutrition of several species, including beef and dairy cattle, sheep, horses, swine, goats, rabbits, guinea pigs, chickens, and turkeys.

Ezra Taft Benson Agricultural and Food Institute. The major objective of the Ezra Taft Benson Agriculture and Food Institute is to raise the quality of life among the people of the world through improved nutrition and enlightened agricultural practices. Research to improve agricultural practices, family nutrition, and appropriate technology is encouraged.

M. L. Bean Life Science Museum. Extensive biological and zoological collections are housed in the M. L. Bean Life Science Museum. The exhibits include habitat studies of local as well as exotic plant and animal species and a large and valuable collection of trophies from North America, Africa, and Asia.

Electron Optics Laboratory. In this lab researchers can accomplish all standard electron optics procedures. The laboratory has transmission and scanning electron microscopes equipped with X-ray microanalysis capabilities, plus accessory equipment for freeze-fracture, freeze-drying, and

necessary support facilities, including confocal laser scan microscopy.

USDA Forest Service Shrub Science Laboratory. Housed on the BYU campus, this lab supports one of the finest research programs on native shrubs in the world. Here eleven PhD research scientists with adjunct faculty appointments work with BYU faculty members and graduate students. Laboratories, greenhouses, and gardens on campus and around the state support studies on desert shrubs.

Lytle Ranch Preserve. Graduate students are able to do year-round on-site research on desert plants and animals at the Lytle Ranch. This large preserve is located in the moderate desert climate of southwestern Utah.

On the Provo campus are greenhouses, gardens, an arboretum, a small animal vivarium, and a tissue culture room. Laboratory facilities include gas chromatography-mass spectrometers, isotope ratio mass spectrometers, transmission and scanning electron microscopes, ultra centrifuges, visible ultraviolet and infrared spectrophotometers, gas chromatographs, high-performance liquid chromatographs, infrared gas analyzers, atomic absorption spectroscopy, and many other items.

Faculty and graduate students are currently engaged in a number of significant and interesting research projects, funded both externally and internally. Some of these are: iron uptake by plants; shrub genetics, ecology, and physiology; biochemical ecology; photosynthetic rate and water-use efficiency in plants; plant growth regulators; forage research; molecular biology of gene expression in mitochondria; marine and freshwater biology; sexual differentiation of the brain; biological science education; effect of nutrient intake on gene expression; environmental science; structural plant science; plant reproductive biology; conservation of rare species.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

Botany

500. (Botny-Range) Chemical and Physiological Ecology. (3)

Prerequisite: Biol 130, Botny 350 (or equivalents), or instructor's consent.

Secondary metabolites and their role in population, community, and ecosystem phenomena.

507. International Issues in Conservation Biology. (3)

International environmental problems, examining major degradational threats and options for preservation. Environmental, political, and social costs and benefits of development in underdeveloped countries.

510. Advanced Taxonomy. (3)

Prerequisite: Botny 210 or instructor's consent.

Review of taxonomic literature and research methods. One three-day field trip arranged.

515. (Botny-Range) Agrostology: Taxonomy and Ecology of Grasses. (3)

Prerequisite: Botny 210.

Classification and ecology of grasses, emphasizing important forage species.

520. Ethnobotany. (3)

Prerequisite: Botny 120.

Use of plants by diverse human cultures. Integration of current anthropological and botanical literature, emphasizing ethnotaxonomies, survival strategies, and ethnomedicine.

521. Ethnobotany Practicum. (1-5)

Prerequisite: Botny 520.

Ethnobotanical research. May require field trip outside continental U.S. Emphasizes participant observation, interviewing techniques, documentary video and film, botanical collecting techniques, and chemical extraction.

522. Biological Instrumentation. (2)

Prerequisite: graduate status or instructor's consent.

Theory and application of research instruments to biological problems.

523. Biological Instrumentation Laboratory. (2)

Prerequisite: Botny 522 or concurrent registration.

Operating research instruments.

526. (Botny-Zool) Cell Biology. (3)

Prerequisite: introductory course in biochemistry.

Molecular physiology and ultrastructure of cells, emphasizing eukaryotic organisms.

527. (Botny-Range) Wildland Shrubs. (3)

Taxonomy and ecology of wildland shrubs. Field trip required.

530. Scanning Electron Optics. (3)

Prerequisite: instructor's consent.

Scanning electron microscopy of biological, physical science, and engineering samples, emphasizing practical applications.

531. Transmission Electron Optics. (3)

Prerequisite: instructor's consent.

Transmission electron microscopy of biological, physical science, and engineering samples, emphasizing practical applications.

534. Lichenology. (3)

Detailed study of lichens, including classification, morphology, and ecology. Field trip required.

539. Paleobotany. (3)

Prerequisite: Botny 105, Geol 103.

Morphology and relationships of fossil plants.

540R. Advanced Topics in Plant Physiology. (3)

Prerequisite: Botny 440 or instructor's consent.

550. Plant Geography. (3)

Distribution of plant species and communities in light of present and past climates.

551. (Botny-Range) Quantitative Ecology. (3)

Prerequisite: Botny-Zool 350 or equivalent, Stat 222 or 501.

Methods of community analysis.

552. (Botny-Range) Terrestrial and Rangeland Ecosystems. (4)

Prerequisite: Botny-Zool 350 or equivalent, Stat 222 or 501.

Biotic communities of the earth; population dynamics; reproductive, life-form, and longevity patterns; species interactions; structure, dynamics, and evolution of communities.

554. Population and Conservation Biology. (3)

Prerequisite: Botny-Zool 350 or equivalent.

Analysis of populations in natural settings; theoretical and practical strategies for conservation of endangered biota and preservation of biodiversity.

559. (Botny-AgHrt) Advanced Plant Breeding. (2)

Prerequisite: AgHrt 459 or equivalent, Botny 341.

Techniques in molecular genetics and their application to plant breeding.

574. (Botny-AnSc) Introduction to Population Genetics. (3)

Prerequisite: introductory courses in genetics and statistics.

Quantitative study of factors influencing changes in gene frequencies in natural and domestic animal and plant populations.

610. Botanical Terminology and Nomenclature. (2)

Prerequisite: instructor's consent.

Botanical terminology, including the contributions of Latin and Greek words, their gender, number, and case.

630. Angiosperm Morphology. (4)

Prerequisite: familiarity with taxonomy, anatomy, and physiology or biochemistry.

Structures, relationships, and evolution of flowering plants.

650R. Advanced Plant Ecology. (2)

Current trends in ecological research and philosophy.

678. Organic Evolution. (3)

Prerequisite: introductory course in genetics or instructor's consent.

691R. Graduate Seminar. (1)

697R. GIS Applications to Natural Resource Management. (2)

Introduction to SPANS GIS for natural resource management. Includes data input, conversion, modeling, analysis, display, and output. For those doing research involving geographically spaced data.

698R. Master's Project. (1-6)

699R. Master's Thesis. (1-9)

799R. Doctoral Dissertation. (1-9)

Range Science

500. (Range-Botny) Chemical and Physiological Ecology. (3)

Prerequisite: Biol 130, Range-Zool 354 (or equivalents), or instructor's consent.

Secondary metabolites and their role in population, community, and ecosystem phenomena.

505. Wildlife Law Enforcement. (3)

Prerequisite: Biol 130 or equivalent.

Current and historical principles of federal and state wildlife law enforcement, case development, evidence, evaluation, human rights, and testimony.

515. (Range-Botny) Agrostology: Taxonomy and Ecology of Grasses. (3)

Prerequisite: Botny 210.

Classification and ecology of grasses, emphasizing important forage species.

527. (Range-Botny) Wildland Shrubs. (3)

Taxonomy and ecology of wildland shrubs. Field trip required.

551. (Range-Botny) Quantitative Ecology. (3)

Prerequisite: Range-Zool 354 or equivalent, Stat 222 or 501.

Methods of community analysis.

552. (Range-Botny) Terrestrial and Rangeland Ecosystems. (4)

Prerequisite: Range-Zool 354 or equivalent, Stat 222 or 501.

Biotic communities of the earth; population dynamics; reproductive, life-form, and longevity patterns; species interactions; structure, dynamics, and evolution of communities.

561. Watershed Management. (3)

Prerequisite: Range-Zool 354 or equivalent.

Water-producing characteristics of forest and rangelands, emphasizing laboratory and field studies of soil and vegetation.

565. Wildlife Behavioral Ecology. (3)

Prerequisite: Biol 130, Range-Zool 354 (or equivalents).

Integration of the principles of ethology, sociobiology, and behavioral ecology using examples from wildlife and livestock. Behavioral sampling methods stressed. Field trip required.

568. Restoration Ecology. (3)

Recommended: AgHrt 282, Range 354, 466 (or equivalents)

Nature of ecosystem disturbance and plant succession. The developing science and practice of ecological restoration. Case studies of upland and riparian restoration.

691R. Graduate Seminar. (1)

697R. Spécial Problems. (1-6)

Advanced study of selected range topics: fire ecology, grazing systems, wetlands and wildlife, ecology, evolutionary biology, plant herbivore interactions, and wildlife behavioral ecology.

699R. Master's Thesis. (1-9)

799R. Doctoral Dissertation. (1-9)

FACULTY

ANDERSEN, WILLIAM R., *Professor.*

PhD, University of California, Davis, 1963. Plant Molecular Genetics.

ANDERSON, VAL JO, *Associate Professor.*

PhD, Texas A&M University, 1989. Range Ecology; Ecophysiology.

BROTHERSON, JACK D., *Professor.* PhD,

Iowa State University of Science and Technology, 1969. Community Ecology; Range Management.

CATES, REX G., *Professor.* PhD,

University of Washington, 1971. Plant/Herbivore Interactions; Ecological Chemistry.

COX, PAUL ALAN, *Professor.* PhD,

Harvard University, 1981. Plant Evolutionary Ecology; Ethnobotany.

FAIRBANKS, DANIEL J., *Associate*

Professor. PhD, University of Arizona, 1988. Genetics; Plant Breeding; Biotechnology.

FLINDERS, JERRAN T., *Professor.* PhD,

Colorado State University, 1971. Wildlife Behavior; Wildlife Habitat.

GARDNER, JOHN S., *Research Professor.*

PhD, Brigham Young University, 1978. Electron Optics; Fungal Ultrastructure.

HARPER, KIMBALL T., *Professor.* PhD,

University of Wisconsin, Madison, 1963. Community Ecology; Plant Reproductive Biology.

HESS, WILFORD M., *Professor.* PhD,

Oregon State University, 1962. Electron Optics; Ultrastructure; Plant Pathology.

ROUNDY, BRUCE A., *Professor.* PhD,

Utah State University, 1984. Vegetation; Restoration Ecology.

RUSHFORTH, SAMUEL R., *Professor.*

PhD, Brigham Young University, 1970. Algology; Evolutionary Morphology; Environmental Policy.

ST. CLAIR, LARRY LEE, *Professor.* PhD,

University of Colorado, 1984. Cryptogams; Environmental Biomonitoring.

SMITH, BRUCE N., *Professor.* PhD,

University of Washington, 1964. Plant Physiology; Growth and Respiration.

TIDWELL, WILLIAM D., *Professor.* PhD,

Michigan State University, 1966. Paleobotany; Anatomy.

WEBER, DARRELL JACK, *Professor. PhD*,
University of California, Davis,
1963. Plant Biochemistry;
Pathology; Xerophyte Physiology.

WELSH, STANLEY L., *Professor. PhD*,
Iowa State University of Science
and Technology, 1960. Plant
Systematics; Western American
and Polynesian Floras.

BUSINESS ADMINISTRATION

Program Director: Gary F. McKinnon

640 TNRB
PO Box 23113
Provo, UT 84602-3113
(801) 378-3500

THE PROGRAM OF STUDIES

The Master of Business Administration Program is administered by the Marriott School of Management. It is a two-year program designed to prepare the graduate student for a career in business. The program focuses on four areas—globalization, integration, technology, and entrepreneurship. Increasingly, international focus and entrepreneurship are encouraged to better prepare the student for the world of business. Currently the program presents a new and exciting approach to teaching business management. Courses are integrated across disciplines in order to use faculty expertise from different points of view. Concept days are alternated with case study days to improve practical application.

The curriculum has been designed to achieve the twofold task of giving the student (1) a general management education and (2) depth in area(s) bearing specifically on personal professional interests.

Students who complete the program will have (1) acquired an understanding of business and management tools and principles that have enduring significance in a changing environment, (2) developed advanced knowledge in a field of concentration in the area of the student's major interest, (3) achieved an understanding of the utilization of quantitative methods and behavioral sciences in the solution of business problems, (4) obtained skills in critical analysis and careful reasoning, and (5) strengthened their ability to communicate effectively.

In addition to the MBA, the Marriott School of Management offers an Executive Option MBA, a joint JD/MBA, and a joint MBA/MA in international area studies.

Business Administration—MBA

MBA classes are generally not available to students other than those in the following programs: master of business administration, juris doctor/master of business administration, master of business administration/master of accountancy, master of business administration/master of arts in international and area studies, or master of organizational behavior. All first-year MBA classes are required for graduation.

Admission and Entry.

- Semesters of entry and application deadlines: fall, March 1 (U.S. and international).
- Application requirements: entrance examination is the GMAT.
- GPA: minimum 3.0 on 4.0 scale.
- Prerequisite: baccalaureate degree from an accredited institution and a background in college algebra.
- Recommended: background in accounting, calculus, economics, and statistics, and a basic course in computer programming.
- In addition to the above, the Executive MBA Option requires a minimum three years of full-time managerial experience.

Requirements for Degree.

- Required courses:
First-Year Program: courses in financial management, marketing management, operations management, managerial economics, macroeconomics and the business environment, business and government, managerial accounting, quantitative methods, computers and management, organizational behavior, written and oral communication, and management simulation.
Second-Year Program: courses in business policy and business and society.
- Electives: see MBA or executive MBA policies and procedures publications.

- Emphases: Entrepreneurship, Corporate Finance, Investment Management, Management of Financial Institutions, Marketing Research and Analysis, Marketing Management, Management Information Systems, Organizational Behavior, Strategic Management, Production and Operations Management, Quantitative Methods.

Executive Option—MBA

The Executive Master of Business Administration Option is a rigorous program in general management for fully employed professionals. Designed for managers and professionals who typically have at least from three to four years of full-time managerial work experience, it consists of courses similar to the full-time MBA Program but is unique in reflecting the work and management experience of its students.

Obtaining an MBA degree through the Executive MBA Option requires a year-round commitment for two years. Class sessions are generally held two evenings each week and occasionally on Saturdays. Students spend one residency week on campus each year in a complex case analysis and other concentrated study. Executive MBA classes are generally not available to students in other programs. Special requests should be made to the Executive MBA Policy Committee, c/o the Executive MBA Office. For details concerning admission requirements and application dates, consult the Executive MBA Office, 637 TNRB, PO Box 23012, Provo, UT 84602-3012, telephone (801) 378-3622.

Joint Program—MBA/JD or MBA/MA

Two joint degrees are offered in connection with the MBA degree. The MBA/JD is a program in business administration and law offered with the J. Reuben Clark Law School. The MBA/MA is a program of business administration and international and area studies sponsored by the David

M. Kennedy Center for International Studies.

Inquiries about any of these programs should be directed to the MBA Office. No joint degrees are available in combination with the Executive MBA Option.

FINANCIAL ASSISTANCE

The MBA Program utilizes Marriott School of Management financial aid provisions. Qualified students can receive aid from the following: the MSM Scholarship Fund, private scholarship donations, assistantship awards, and loan assistance. Currently the MSM has over twenty-five private scholarships.

RESOURCES AND OPPORTUNITIES

Business administration students utilize the N. Eldon Tanner Building, which houses the Marriott School of Management. Surrounding the dramatic eight-story atrium at the building's center are lecture and seminar rooms, study rooms, a computer laboratory, and a working library.

The Marriott School of Management is recognized as one of the outstanding management schools in the nation. Faculty are actively engaged in research and publication, and they fill leadership positions in a number of national professional organizations. The school has developed innovative educational programs that include internships, executive visitation programs, special student consulting and research projects, and other activities designed to bring management education and training closer to management practice. This is accomplished, in part, through the MSM's National Advisory Council and the Executives on Campus Program.

Consisting of sixty-five to seventy prominent business and government executives, the National Advisory Council lends major support to the Marriott School of Management. Students benefit by interacting with

council members in special campus lectures and seminars and by visiting or working with these executives in their respective organizations. Furthermore, the council assists students with placement opportunities, helps develop funding sources for scholarships, and provides professional development for faculty members.

The Executives on Campus Program gives students an opportunity to interact with distinguished business and government leaders who come to campus. These executives visit classes and meet with student organizations as well as participate in the Executive Lecture Series and the Entrepreneurship Lecture Series.

COURSE DESCRIPTIONS

MBA Required Courses

97R. Computer Skills for Managers. (0)

One-week review of computer skills, offered before first semester for those without adequate background. Fee.

500. Corporate Financial Reporting. (2.5)

Analyzing wide variety of financial reporting issues via published corporate financial statements.

510. Managerial Economics. (2.5)

Application of specific micro-economic principles to business operations in a market economy.

511. Macroeconomics and Business Environment. (2)

Aggregate economic fluctuations and their impact on business decisions.

520. Business Finance 1. (2.5)

Short-term financing of a business operation. Developing techniques for financial planning, such as analysis of ratios, profitability, and liquidity.

530. Statistical Analysis. (2.5)

Introduction to applied business statistics, emphasizing hypothesis-testing techniques and simple and multiple correlation and regression.

533. Operations Management 1. (2)

Strategic positioning, planning, coordination, and physical processes of delivering services or manufacturing products. Included are such topics as product and process design, inventory planning and control, quality assurance, work force motivation, incentives, and control.

540. Organizational Behavior. (2.5)

Analysis of individual, group, and organization variables that inhibit or facilitate effective organizational functioning. Topics include motivation, rewards, leadership, conflict, decision making, structure, evaluation, and change.

550. Marketing Management 1. (2)

Development of analytical marketing tools and techniques; their utilization in case analysis and decision making in marketing management.

560R. Integrative Exercise. (0.5)

Integrated applications of case analysis and presentation skills. Students work as groups to analyze cases and formulate recommendations, then make professional presentations to groups representing management.

561. Written and Oral Communication 1. (2)

Most frequent business communication techniques. Learning accepted business correspondence and report-writing concepts and developing skills that contribute to effectiveness in oral and written situations in business.

562. Written and Oral Communication 2. (1.5)

Continuation of Written and Oral Communication 1. Analysis of oral communication techniques in practice and limited theory. Several experiences presenting orally before video cameras with expert feedback. Practice presenting orally before peers. Supervised goal setting and self-improvement in written and oral communication situations.

569. Quantitative Case Preparation. (0.5)

Basic modeling and data summarization. Utilizing spreadsheets in quantitative business cases.

570. Data Exploration. (1)

Graphical and statistical techniques for extracting managerial insights from business data. Effective communication of quantitative findings for business decision making.

580. Introduction to Strategy. (2)

Introduction to strategic planning; concepts, models, and analysis.

585. Management and Technology. (2.5)

Management and control with information technology. Information flow, database design, and use applied to cost controls and managerial decision making.

591. Business, Government, and International Economy. (3)

Holistic analysis of environment in which corporations exist and operate: changing economic, political, and social forces and institutions and policies through which different communities influence activities of business.

593R. Management Seminar. (1)

Invited guests speak on topics of general management interest ranging from ethics, industry problems and opportunities, and government policies to relevant current events.

680. Business Policy. (3)

Top-management approach to the problems of determining corporate strategy.

682. Ethics, Business, and Society. (3)

Nature of personal and corporate responsibility from perspective of global system in which we all live.

The forces operating business firms and those created by business firms, such as individual ethics, labor relations, urban affairs, race and sex discrimination, and government relations.

MBA Electives**572. Business Chinese 1. (3)**

Prerequisite: fluency in Chinese.

For experienced speakers of Chinese. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

573. Business French 1. (3)

Prerequisite: fluency in French.

For experienced speakers of French. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

574. Business German 1. (3)

Prerequisite: fluency in German.

For experienced speakers of German. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

575. Business Japanese 1. (3)

Prerequisite: fluency in Japanese.

For experienced speakers of Japanese. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

576. Business Korean 1. (3)

Prerequisite: fluency in Korean.

For experienced speakers of Korean. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

577. Business Spanish 1. (3)

Prerequisite: fluency in Spanish.

For experienced speakers of Spanish. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

578. Business Portuguese 1. (3)

Prerequisite: fluency in Portuguese.

For experienced speakers of Portuguese. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

581. Business Policy. (3)

Top-management approach to problems of determining corporate strategy. Structured for accounting students.

586 Data Communication. (3)

Prerequisite: admission to MSM graduate program.

Principles of data communications, local and wide area networks, hardware, software, media, standards, application, implementation, and management.

599. Internship Practicum. (1–9)

Internship providing hands-on experience in management positions.

601. Managerial Accounting 2. (3)

Continuation of Managerial Accounting 1, with particular emphasis on process costing systems and current costing issues, problems, and applications. Course requires completion of approved project.

602. Federal Income Taxation. (3)

Analysis of business transactions for their tax factors. Basic structure of the law and implications of both personal and corporate income tax.

603. Advanced Information Systems Analysis. (3)

Prerequisite: admission to MSM graduate program.

Advanced systems analysis and design, emphasizing information requirements, input/output analysis, and procedure documentation.

604. Advanced Information Systems Design. (3)

Prerequisite: ISys 643

Advanced concepts and techniques of systems analysis and design, emphasizing systems development, systems tools, prototyping, and related topics.

605. Advanced Database Analysis and Design. (3)

Advanced database organization, emphasizing conceptual and logical design, semantic modeling, database integrity, and security.

606. Seminar in Current Accounting Problems. (3)

Current accounting thought and issues. Varied course content and format in accordance with interests of the instructor and students.

607. Management Consulting and Projects. (3)

Prerequisite: MBA 603.

Application of technical knowledge in the role of a consultant to management. Includes preparation of proposals, conducting an engagement, reporting results, and recommending change.

608. Advanced Fourth-Generation Programming Languages. (3)

Advanced skills development in programming languages, emphasizing fourth-generation languages.

610. Consulting Applications of Economic Analysis. (3)

Applying economics, including dynamic modeling, to problems of managing business transactions.

611. National and International Business Environment. (3)

Prerequisite: MBA 610.

Presentation of the macroeconomy at intermediate level, with special attention to government and international trade sectors.

613. Business and Economic Forecasting: Theory and Application. (3)

Forecasting methodologies, emphasizing time series analysis and stressing practical applications.

614. Market Analysis and Decision Making. (3)

Marketing research, economic theory, and statistics in managerial decision making. Understanding management's role in working with technical specialists to improve business planning.

615R. Seminar in Managerial Economics. (3)

Preparing and presenting economic analysis to line managers.

616. Principles of Risk and Insurance. (3)

Identifying, measuring, and dealing with personal risk. Introduction to property/casualty as well as life and health insurance issues and products.

617. Risk Management. (3)

Management of risk exposures in a business setting. Identifying, measuring, and dealing with both traditional insurable risks and financial risks..

618. Personal Financial Planning. (3)

Financial decision making by the household: income tax, retirement and estate planning, investment strategy, portfolio management, and personal risk management. Business interests affecting personal finances.

620. Topics in Finance. (3)

Selected issues in financial management and/or investments.

621. Advanced Corporate Finance. (3)

Issues such as mergers/acquisitions, valuation, financial restructurings, leveraged buyouts, capital structure, international portfolio analysis, tax-driven decisions, leasing, recapitalizations, and industry restructurings.

622. Investments. (3)

Basic principles and techniques of investment analysis and portfolio selection and management. Portfolio policies available to investors.

623. Investment Theory and Evidence. (3)

Modern investment theory and evidence, including asset pricing models, options pricing, the efficient markets hypothesis, portfolio diversification, and performance measures.

624. Capital and Security Markets. (3)

Functions and instruments of capital markets: relationships to money markets, historical background, structures, and analysis of significant economic problems and trends in the markets.

625. Management of Financial Institutions. (3)

Problems and policies of financial institutions, including competition for funds, asset liability management, capital management, strategic diversification, and shaping of competitive strategy.

626. Short-Term Financial Management. (3)

Overview of treasurer's function: cash, liquidity, payables and receivables management; short-term borrowing, electronic data interchange, bank service products, international transactions, and forecasting.

627. International Finance. (3)

Impact that currency, tax, and capital market variations between countries have on sourcing of funds, management of working capital, investment of funds, and protection of assets. Understanding the foreign exchange market.

628. Futures and Options Markets. (3)

Futures markets (with a primary orientation toward commodity speculation) and theory of options pricing; formation and use of options pricing techniques; investment strategies using options.

629. Silver Fund. (3)

Team management of actual investment portfolios for a full year. Responsibility for economic forecasts, security selection, and portfolio strategy. Students apply for a position of management in the spring for the following year. Selections for participation made by faculty committee.

630. Managers Quantitative Tool Kit 1. (3)

Development of computer-augmented practical skills available to today's managers. Modules include modeling, simulation, optimization, survey statistics, forecasting, econometrics, and graphic presentation.

631. Advanced Data Analysis. (3)

Use of standard methods of statistical estimation and inference in analyzing empirical and experimental data. Topics include introduction to experimental design, analysis of variance and covariance, factor analysis, multiple regression, and discriminant analysis.

632. Managers Quantitative Tool Kit 2. (3)

Continuation of Managers Quantitative Tool Kit 1.

633. Operations Management 2. (3)

Completion of operations fundamentals begun in MBA 533. Production and associated management systems that exist in business enterprises.

634. Total Quality Management. (3)

Developing a structural system for meeting and exceeding customer needs and expectations, including topics such as developing teams, benchmarking, paradigm shifts, and statistical SPC and QFD.

635. Systems Analysis and Design. (3)

Application of business systems analysis and design to situations ranging from small intracompany functional units to large company-industry interactions.

636. Operations Management Seminar. (3)

Cases, readings, and research on current industrial practices and problems in production and operations management.

637. International Management and Production Techniques. (3)

International manufacturing processes and relationships. Variations that occur in policy and techniques between countries.

638. Strategic Issues in Manufacturing. (3)

Interface of strategy and manufacturing. Topics include: capacity and facilities management, work force management, quality management, technology management, vertical integration, manufacturing infrastructure, manufacturing interface with other functions, and incorporating manufacturing in corporate strategy.

643. Management Philosophy and Style. (3)

Contemporary models of management and developing a philosophy of management.

644. Advanced Personnel Administration. (3)

Prerequisite: one course in statistics and/or research methodology.

Personnel functions from a theoretical, applied, and research orientation: manpower planning, selection, interviewing, test validation, performance appraisal, equal opportunity, compensation, and employee relationships.

645. Managing Organization Cultures. (3)

Insights and skills used to diagnose relationship between organizational mission and organizational culture. Patterned customs and meanings of a particular group, such as taken-for-granted assumptions, values, and conceptual frameworks. Primarily oriented toward getting students into organizations where they can apply and improve their skills and insights.

646. Organizational Theory. (3)

Concepts and research findings from psychology, social psychology, sociology, cultural anthropology, and systems theory that are useful in understanding behavioral forces operating in complex organizations and their implications for organizational development.

647. Advanced Seminar in Organizational Behavior. (1-3)

Varied topics may include conflict resolution, power and influence, intergroup relations, career development and planning, and management skills.

648. Dynamics of Organization Change: Interventions and Strategies. (3)

Forces operating to induce or resist change in organizations; strategy and tactics of organization change; current methods of producing organization change.

649 (MBA-OrgB 531). Managing Entrepreneurial Firms and Family Businesses. (3)

Issues and problems faced by managers of entrepreneurial enterprises and leaders of family-owned businesses.

650. Marketing Research and Information Systems. (3)

Consulting course that blends marketing theory and practice and for which a commissioned, proprietary, marketing research project is the major component. Problem identification and definition, descriptive research techniques, uni- and multivariate analysis, and development of actionable recommendations based on market data.

651. Buyer Behavior and Marketing Decisions. (3)

Applying behavioral science concepts and consumer research methods and findings to marketing problems. Behavioral dimensions of markets and market segments as they influence marketing decisions.

652. Quantitative Methods and Market Analysis. (3)

Applying quantitative methods in marketing analysis, including various forecasting procedures, multidimensional scaling, multiple discriminant analysis, Bayesian decision making, analysis of variance, regression and correlation, and other techniques.

653. Seminar in Marketing. (3)

Intensive study of selected marketing topic such as international marketing, social issues in marketing, government regulation of marketing, sales forecasting, institutions and channels, marketing in nonbusiness organizations, marketing theory, and marketing models.

654. Sales Management. (3)

Personal selling and sales management, including strategic role of personal selling; business-to-business selling; organizing, directing, and compensating the sales force; and evaluating sales performance.

655. Retailing Management. (3)

Management perspective of retail strategy, merchandising, inventory management, promotion, location, and control. For those planning a retailing career.

656. Business Negotiating. (3)

Managerial negotiating skills through frequent student one-on-one and group negotiations that are videotaped and then reviewed.

657. Product Management. (3)

Developing and managing consumer and international products: product selection, line planning, brand management, packaging, market testing, government regulations, market launch, and competitive strategy.

658. International Marketing. (3)

Institutions and techniques related to marketing goods and services in other countries: international dimensions of product, price, distribution channels, and promotion as they are adjusted to meet social, cultural, and political environments found in other countries.

659. Business-to-Business Marketing. (3)

Company and institutional markets, managing R&D and technical product development, building and managing customer relationships and service, and competitive bid pricing in business market environment.

660. Strategic Marketing and Planning. (3)

Strategic market analysis and development and implementation of a strategic marketing plan for a new product, new business, or an ongoing operation.

666. Managing Human Resource Strategically. (3)

Understanding key human resource activities (selection, training, appraisal, compensation, and development) and how managers can use them to help formulate and implement strategies.

672R. Business Chinese 2. (1.5)

Prerequisite: fluency in Chinese.

For experienced speakers of Chinese. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

673R. Business French 2. (1.5)

Prerequisite: fluency in French.

For experienced speakers of French. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

674R. Business German 2. (1.5)

Prerequisite: fluency in German.

For experienced speakers of German. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

675R. Business Japanese 2. (1.5)

Prerequisite: fluency in Japanese.

For experienced speakers of Japanese. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

676R. Business Korean 2. (1.5)

Prerequisite: fluency in Korean.

For experienced speakers of Korean. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

677R. Business Spanish 2. (1.5)

Prerequisite: fluency in Spanish.

For experienced speakers of Spanish. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

678R. Business Portuguese 2. (1.5)

Prerequisite: fluency in Portuguese.

For experienced speakers of Portuguese. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

683. Entrepreneurial Perspective. (3)

Developing awareness of and ability to apply existing knowledge about entrepreneurship to make better decisions when starting, growing, and harvesting business ventures.

684. Global Management 1. (3)

Foundation course for students interested in global management—international finance, operations, marketing, and strategy taught in an integrated format.

685. Global Management 2. (3)

Prerequisite: MBA 684.

Continuation of Global Management 1.

686. Real Estate Management. (3)

Applying principles and techniques of property investments, including determining value, financing arrangements, and marketing and management problems.

688 (MBA-ManEc). Applied**Econometrics. (3)**

Prerequisite: ManEc 300, 301, calculus or equivalent, and a first course in econometrics.

Econometric techniques and applications.

689. Business Law. (3)

Introduction to body of law that governs behavior of corporate executives in their relations with board of directors, stockholders, and general public.

690R. Management Field Study. (3)

Experience working with faculty and management in assisting businesses with specific projects.

692. Business in History. (3)

Origins of modern business and corporate activity in Europe; development of modern business in the United States; and use of historical analysis as a tool for management. Lectures, readings, cases, and discussions of entrepreneurs, corporations, and industries.

693R. Readings and Conference. (1-3)

Subject to be arranged with instructor. Approval must be obtained from the MBA Office.

Executive MBA Required Courses

500. Introduction to Management. (2.5)

Five days on campus emphasizing the broad range of managerial issues and decisions.

501. Management Fundamentals 1. (9)

Major business concepts and tools of finance, organizational behavior, marketing, operations, information systems, communications, micro- and macroeconomics.

502. Management Fundamentals 2. (9)

Continuation of Management Fundamentals 1.

503. Management Integration. (7)

Taught concurrently with the two Management Fundamentals courses. Relates functional concepts to each other and the business environment.

600. Introduction to Strategy. (4)

Tools and concepts for strategy formulation and implementation; industry analysis and role of general manager. Intensive week on campus required.

610. Business, Government, and International Economics. (3.5)

Analysis of environment in which corporations exist and operate—changing economic, political, and social forces.

638. Technical Management, Project Management and Services. (3)

Manufacturing process and product development, time to market, rapid response manufacturing and distribution, and the unique requirements of service businesses.

680. Business Policy. (3)

Top-management approach to problems of determining corporate strategy.

684. International Management. (4)

Aspects of conducting business in a global environment, culminating with an international excursion visiting companies in several countries.

690. Management Practicum. (3)

Applying management concepts by working in groups on multi-disciplinary projects with their own companies.

Executive MBA Electives

620. Corporate Financial Strategy. (3)

Important problems surrounding issues of financial strategy and tactics confronting top financial and general managers.

622. Investments. (2)

Review of modern investment theory. Practical study of principles and techniques of investment analysis, portfolio selection, and management.

630. Personal Finance/Risk Management. (2)

Financial decision making by the household, including how business interests and risk affect personal finances.

632. Corporate Entrepreneurship/Innovation. (2)

Fostering innovation and change within existing corporations, including challenge of motivating workers to deal with changing environments.

635. Introduction to Business Negotiation. (2)

Principles and processes of conducting negotiations in business.

640. Advanced Seminar in Organizational Behavior. (3)

Special topics or problems in organizational behavior, e.g., conflict resolution, power and influence, intergroup relations, career development, and planning or management skills.

650. Seminar in Marketing. (3)

Selected marketing topics such as international marketing, government regulation of marketing, marketing theory, and marketing models.

660. Advanced Operations Management. (3)

Presentations and discussion of classical and current models and solution techniques in production and operations management.

670. Influencing Public Policy. (2)

Understanding issues and effects of public policy and how managers can work to affect policies.

682. Ethics, Business and Society. (2)

Nature of personal and corporate ethical responsibility from perspective of global system.

693. Selected Topics in Management. (3)

Subject(s) to be determined by instructor.

FACULTY

ADOLPHSON, DONALD L., *Professor.*

PhD, University of Wisconsin, Madison, 1973. Operations.

ANDRUS, ROMAN R., *Professor.* PhD, Columbia University, 1965.

Marketing.

BARNES, HOWARD W., *Professor.* Dr. rer. pol., Technical University of Brunswick, Germany, 1968.

Marketing; International Business.

BRYSON, PHILLIP J., *Professor.* PhD, Ohio State University, 1967.

Economics.

CALL, IVAN T., *Professor.* DBA, Indiana University, Bloomington, 1969.

Financial Management; Management of Financial Institutions.

COX, CHARLES M., *Associate Professor.*

PhD, University of Washington, 1978. Corporate Finance.

DAINES, ROBERT H., *Professor.* DBA, Indiana University, 1966. Finance.

GEURTS, MICHAEL D., *Professor.* PhD,

University of Oregon, 1972. Sales Forecasting; Marketing Research.

GIAUQUE, WILLIAM C., *Professor.* DBA, Harvard University, 1972.

Quantitative Business Analysis.

HANSON, GARTH, *Associate Lecturer.*

PhD, University of Nebraska, 1973. Marketing and Organizational Behavior.

HARTMAN, LARRY D., *Associate*

Professor. EdD, Oklahoma State University, 1973. Communication.

HEATON, HAL B., *Associate Professor.*

PhD, Stanford University, 1983. Finance.

HILL, NED C., *Professor.* PhD, Cornell University, 1976. Finance.

HUNT, H. KEITH, *Professor.* PhD, Northwestern University, 1972.

Marketing.

JACKSON, W. BURKE, *Associate*

Professor. PhD, Stanford University, 1978. Operations Management; Manufacturing Strategy.

LAMBERT, WILLIAM R., *Associate*

Professor. DBA, Indiana University, Bloomington, 1968. Investments.

LEE, TERRY NELS, *Associate Professor.*

PhD, University of Washington, 1973. Production; Quantitative Methods.

McKINNON, GARY F., *Professor.* PhD, University of Texas, Austin, 1968. Marketing.

McQUEEN, GRANT R., *Associate Professor.* PhD, University of Washington, 1989. Finance.

MERRILL, CRAIG, *Assistant Professor.* PhD, University of Pennsylvania, 1994. Finance; Insurance.

NELSON, RAY. D., *Associate Professor.* PhD, University of California, Berkeley, 1975. Managerial Economics.

PINEGAR, J. MICHAEL, *Professor.* PhD, University of Utah, 1982. Finance.

PLENERT, GERHARD J., *Associate Professor.* PhD, Colorado School of Mines, 1987. Operations.

RINNE, HEIKKI, *Associate Professor.* PhD, Purdue University, 1981. Marketing.

SAWAYA, WILLIAM J., JR., *Associate Professor.* PhD, Arizona State University, 1971. Operations Management.

SCHILL, RONALD L., *Professor.* PhD, University of Oregon, 1971. Industrial Marketing/Procurement; Sales Management.

SMART, KARL, *Assistant Professor.* PhD, University of Florida, 1989. Rhetorical Strategies; Technical Communications; American Culture; Composition.

SMITH, MILTON E., *Professor.* PhD, University of Utah, 1981. Management of Financial Institutions; Insurance.

SMITH, SCOTT M., *Professor.* PhD, Pennsylvania State University, 1979. Marketing.

STONE, BERNELL K., *Professor.* PhD, Massachusetts Institute of Technology, 1968. Finance.

SWENSON, MICHAEL J., *Associate Professor.* PhD, University of Oregon, 1980. Marketing.

SWINYARD, WILLIAM R., *Professor.* PhD, Stanford University, 1976. Marketing; Consumer Behavior.

THOMPSON, MICHAEL P., *Associate Professor.* PhD, Rensselaer Polytechnic Institute, 1985. Communication.

THORLEY, STEVEN R., *Assistant Professor.* PhD, University of Washington, 1991. Finance.

TIMM, PAUL ROY, *Professor*. PhD, Florida State University, 1977. Organizational Communications; Psychology Management.

WHITLARK, DAVID B., *Assistant Professor*. PhD, University of Virginia, 1990. Marketing.

WILSON, BRENT D., *Associate Professor*. DBA, Harvard University, 1969. International Business.

CHEMICAL ENGINEERING

Chair: Richard L. Rowley
Graduate Coordinator: William G. Pitt

350 CB
 PO Box 24100
 Provo, UT 84602-4100
 (801) 378-2589

THE PROGRAM OF STUDIES

The Department of Chemical Engineering at BYU is housed in the five-story Clyde Building, a multimillion dollar, 176,000-square-foot engineering center of classrooms, office space, and laboratories. State-of-the-art equipment, modern labs, and many support facilities help achieve the growing recognition the department receives from around the country. The department prides itself on the level and quality of cutting-edge research with which its faculty members are involved. Funding for departmental research is over \$3 million per year, with faculty and graduate students publishing results of technically innovative and scientific research in a multitude of reviewed journal articles and books each year. This department is the home of an NSF Engineering Research Center focusing on the area of combustion. There are also strong research programs in catalysis, thermodynamics, and bioengineering.

The Department of Chemical Engineering offers three degrees: Chemical Engineering—MS, Engineering Management—MEM, and Engineering—PhD. The department also offers a combustion engineering minor and an integrated master's program.

The department has approximately thirty-five graduate students. The typical length of study in the department is two years for an MS degree, a year and a half for an MEM degree, and four and a half years for a PhD degree.

Chemical Engineering—MS

An MS in chemical engineering prepares the student for a wide variety of employment experiences in industry, all the way from plant operation to plant design. Employment opportunities in research may also be available to qualified MS graduates. Usually employment is readily available, and starting salaries are slightly higher than for BS graduates. The MS degree is designed to give the student a solid foundation in chemical engineering principles and a strong research experience. For students desiring design experience rather than research experience, the MS degree with design emphasis is available. See the Chemical Engineering Department handbook for details.

Admission and Entry.

- Semesters of entry and application deadlines: fall, March 1 (U.S. students or Canadian students seeking financial aid and international students) and May 1 (U.S. or Canadian students not seeking financial aid); winter, July 1 (U.S. or Canadian students seeking financial aid and international students) and September 1 (U.S. or Canadian students not seeking financial aid); spring, November 1 (U.S. or Canadian students seeking financial aid and international students) and January 1 (U.S. or Canadian students not seeking financial aid). Applicants with a BS in a major other than chemical engineering are recommended to apply for spring term.
- Entrance examinations: there is no entrance examination for applicants who hold a BS from U.S. or Canadian schools. However, international applicants must submit general GRE and TOEFL scores. The GRE advanced engineering subject test is encouraged.
- Prerequisite: BS degree (or equivalent) in chemical engineering from a school accredited by the Accreditation Board for Engineering and Technology (ABET), with a minimum 3.0 GPA in upper-division chemical engineering courses and a minimum 3.3 GPA in all courses. A

BS degree in other engineering fields, chemistry, physics, materials science, or metallurgy requires provisional admission.

Requirements for Degree.

- Credit hours: minimum 34 hours including 6–9 thesis hours (ChEn 699R). No more than 9 hours of 300–499 level course work will apply toward the master's degree.
- Required courses: ChEn 501, 531, 533, 535, 691R (every semester) and electives (13–15 hours). For requirements of special programs, see departmental brochure.
- Residency requirement: residency is required for the major part of the work toward the master of science thesis. This work must be completed under the specific direction of a graduate faculty member while the student is in residence at BYU (at least two consecutive full-time semesters). "In residence" is defined as (1) being registered for credit as a graduate student and (2) living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty. Further, all work applying toward any master's project or thesis must be completely open for university review and publication. Any exceptions to the above must be supported by written approval from the department and college and obtained in advance of any work being performed.
- Prospectus: each student must submit a written prospectus on his or her proposed thesis topic during the first year of study.
- Thesis.
- Examinations: a comprehensive qualifying examination on graduate engineering course work must be taken and passed generally at the middle of the second semester of the graduate program (see the department graduate handbook). The examination is offered once a year.
- Oral defense of thesis.
- Cumulative GPA: 3.0 or above in all MS degree classes.

Engineering Management—MEM

The MEM is jointly sponsored by the Marriott School of Management and the College of Engineering and Technology. As such, the program incorporates increased technical learning in chemical engineering with those skills needed to become an efficient and effective manager. With this focus the type of career preparation gained will allow the student to remain in professional engineering activities and yet be capable of working with managers or becoming a manager of technical activities.

The majority of MEM graduates go out as engineers but more fully prepared to move into management positions. The program offers the student an increased awareness of the interrelationship of engineering, marketing, production, finance, operations management, accounting, and other essential managerial skills.

Minimum requirements include a BS degree in chemical engineering or enrollment in an integrated master's program (with the expectation of completing a BS degree by December of the year of entry and the ability to include required management courses taught during the term or semester of entry).

MEM students must take classes in the Chemical Engineering Department and should confer with the department graduate coordinator to be assigned an advisor.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 1 (U.S. and international). Fall semester entrance is strongly recommended. Entry spring and summer terms is available but will extend the length of the program.
- Application requirements: the entrance examination is the GRE general test for applicants from non-ABET (Accreditation Board for Engineering and Technology, Inc.) accredited institutions. Indicate in

writing a desire to be considered for the program. Submit application to Graduate Admissions, B-356 ASB, PO Box 21341, Provo, UT 84602-1341.

- Prerequisite: baccalaureate degree in chemical engineering.

Requirements for Degree.

- Credit hours (40): minimum 40 course work credit hours.
- Basic curriculum requirements: *fall semester*—Mgt 501 (3), 561 (3), EngT 500 (1), technical electives (6); *winter semester*—Mgt 511 (3), 541 (3), 562 (3), EngT 501 (1), technical elective (3); *spring term*—Mgt 551 (3), technical elective (3); *summer term*—Mgt 580 (3), 565 (2), technical elective (3). See p. 116 for course descriptions.

Financial Assistance.

Scholarship funds are available from the Jerry Christiansen Scholarship funds.

Engineering—PhD

A PhD in chemical engineering indicates that the graduate is capable of and qualified to conduct independent and original research in the chemical industries and other related fields. A PhD is nearly always required for someone seeking an academic career. Employment in industry is always available, and starting salaries are considerably higher than for BS or MS graduates. The doctoral program is designed to prepare the student for a lifetime of intellectual inquiry and research and is therefore more rigorous and demanding than the MS program. Students who are dedicated, diligent, and thoughtful and who can work independently are most suited for a PhD in chemical engineering at BYU.

Admission and Entry.

- Semesters of entry and application deadlines: fall, March 1 (U.S. or Canadian students seeking financial aid and international students) and May 1 (U.S. or Canadian students not seeking financial aid); winter, July 1 (U.S. or Canadian students

seeking financial aid and international students) and September 1 (U.S. or Canadian students not seeking financial aid); spring, November 1 (U.S. or Canadian students seeking financial aid and international students) and January 1 (U.S. or Canadian students not seeking financial aid). Applicants with a BS in a major other than chemical engineering must apply for the MS program.

- Entrance examinations: there is no entrance examination for applicants who hold a BS or MS degree from U.S. or Canadian schools. However, international applicants must submit general GRE and TOEFL scores. The GRE advanced engineering subject test is recommended.
- Prerequisite: BS degree (or equivalent) in chemical engineering from a program accredited by the Accreditation Board for Engineering and Technology (ABET), with a minimum 3.0 GPA in upper-division chemical engineering courses and a minimum 3.3 GPA in all courses.

Requirements for Degree.

- Credit hours: minimum 68 semester hours, at least 50 of which must be course work beyond the baccalaureate degree, plus 18 hours of dissertation (ChEn 799R).

Candidates Without a Master's Degree: 50 hours, a minimum 38 of them in graduate-level courses. At least 12 hours of the 50 must be in advanced mathematics, statistics, or computer science (a portion of which may be upper-division undergraduate level, with specific departmental approval) and a minimum 18 hours of dissertation (ChEn 799R).

Candidates with a Master's Degree: with committee approval, up to 20 hours of previous graduate work, including 4 hours of thesis, may apply toward the doctorate. In addition, other courses taken in the master's program may apply toward the required 12 hours of advanced mathematics, statistics, or computer science. No more than 12 hours of 300–499 level course work will apply toward the doctorate.

- Required courses: ChEn 501, 531, 533, 535, 791R (every semester), 12 hours of advanced mathematics, statistics, or computer science, and 25 hours of elective courses.
- Study list: the graduate study list must be submitted during the first semester of doctoral study.
- Residency: see residence requirements listed in the preceding Chemical Engineering—MS section.
- Comprehensive qualifying examination: during the second semester students must take and pass a written comprehensive qualifying examination based on graduate course work. The results of this examination are considered together with other performance criteria in evaluating the student for admission to candidacy.
- Prospectus: each student must submit and successfully defend a written prospectus on his or her proposed dissertation research topic during the second year of study. The quality of the prospectus is considered together with other performance criteria in evaluating the students for admission to candidacy.
- Dissertation.
- Oral defense of dissertation.
- Cumulative GPA: 3.0 or above in all PhD courses.

Integrated Master's Program—BS/MS

Students who desire to obtain a master's degree in engineering, and who have been accepted to a department professional program, may elect to enter the integrated master's program at the end of the sophomore year or during the junior year of the engineering curriculum. The purpose of the program is to afford greater flexibility in scheduling course work than is normally available through a traditional BS degree followed by an MS degree program.

In this program the BS degree may be received before or simultaneously with the MS degree (normally five years from freshman matriculation). Specific requirements are the same as

those listed for the chemical engineering MS but include the following:

Admission and Entry.

Application requirements: formal application for admission submitted to the Office of Graduate Studies (B-356 ASB) before completion of final 34 hours of combined graduate and undergraduate course work. Applicants must have a cumulative 3.3 or higher GPA and a 3.0 GPA in all chemical engineering classes.

Requirements for Degree.

- Maintenance requirements: cumulative 3.0 GPA or above in upper-division and graduate chemical engineering courses and satisfactory performance evaluation by the research advisor.
- Degree requirements: same as MS degree including a cumulative 3.0 GPA or above in all master's degree courses and, during first semester of registration as a graduate student, submission of a final study list that specifies all technical elective courses.

Combustion Engineering—Minor

- Credit hours: 9 hours on the master's level, and 12 hours on the doctoral level.
- Required courses: ChEn 533, 633, 733.
- Electives: select from Chem 759R, ChEn 641, 693R.
- Research in combustion-related area.
- Examination: comprehensive examination.

FINANCIAL ASSISTANCE

Through support from the Key Industries Program, the university, and faculty research contracts, many scholarships, fellowships, research assistantships, and teaching assistantships are available to chemical engineering students. The department also has a few prestigious fellowships in excess of \$10,000 for qualifying students:

- Dupont/Conoco Incorporated Fellowship,

- Huntsman Chemical Corporation Fellowship.

RESOURCES AND OPPORTUNITIES

The Department of Chemical Engineering utilizes many facilities. The Advanced Combustion Engineering Research Center (ACERC) is nationally recognized as a leading center for interdisciplinary combustion research. Sponsored by the National Science Foundation (NSF) as an engineering research center, ACERC has secured significant additional financial support from U.S. corporations. Students and faculty associated with the center pursue experimentation, analysis, computer modeling, and design of combustion systems. The center is designated as a state Center of Excellence and as such has received additional financial support from the state of Utah.

Advanced Composites Manufacturing and Engineering Center (ACME). This center was established to promote the use and understanding of advanced materials, largely in support of the existing composite and plastic material companies operating in the state of Utah. ACME has extensive test equipment for determining physical, mechanical, chemical, and in-use properties of composites and plastic materials.

Catalysis Laboratory. The lab has a fourteen-year history of productive research in heterogeneous catalysis. Highly interdisciplinary in nature, this research applies principles of kinetics, chemistry, materials science, surface science, and chemical engineering to the understanding of catalyst properties and catalytic reactions.

All of the faculty actively participate in research endeavors, and a number have gained international recognition for their work. Faculty research is particularly strong in the following areas: biomedical engineering; chemical propulsion; coal combustion and gasification; computer simulation; thermodynamics; kinetics and catalysis; materials; process design and control;

statistical mechanics; transport phenomena.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500. Creative Skills in Chemical Engineering. (1)

Application of creativity and technical knowledge from prior course work to solution of relevant, open-ended problems.

501. Directed Graduate Studies. (2)

Guided preparation for department's comprehensive exams and for formulation of research prospectus.

510. Principles of Reservoir Engineering. (3)

Prerequisite: ChEn 373.

Reservoir and hydrocarbon classification; fluid flow; primary oil and gas recovery mechanisms; enhanced oil recovery.

518. Biomedical Engineering Principles. (3)

Prerequisite: ChEn 376, Math 215.

Application of chemical engineering principles to model physiologic systems and to solve medical problems.

531. Thermodynamics of Multicomponent Systems. (3)

Prerequisite: ChEn 373 or 461.

Fundamental concepts and applications in first and second laws, equilibrium and stability, phase equilibrium, and homogeneous and heterogeneous chemical equilibrium.

533. Transport Phenomena. (3)

Prerequisite: ChEn 476 or concurrent registration. Recommended: Math 323.

Transport mechanisms and coefficients and fundamental field equations for momentum, heat, and mass transport, with application to system design.

534. Advanced Separations. (3)

Prerequisite: ChEn 533, Math 321.

General theory of differential and stagewise diffusional and separation operations, multicomponent distillation, extraction, and absorption; application of this theory to solution of complex problems, including column design and instrumentation.

535. Kinetics and Catalysis. (3)

Prerequisite: ChEn 478.

Theories and principles of chemical kinetics, including heterogeneous catalysis and reactor design.

536. Digital Process Control. (2)

Prerequisite: ChEn 436.

Computer application of advanced control algorithms to chemical processes.

541. Computer Design Methods. (2)

Prerequisite: Math 311, ChEn 376.

Computer-aided design and numerical methods of chemical engineering processes.

578. Polymer Science and Engineering. (3)

Prerequisite: introductory materials engineering course.

Fundamentals of polymer chemistry and physics and their implications in engineering applications. Topics include polymerization chemistry, structure-property relationships, polymer physics, and transport properties.

631. Applied Statistical Mechanics. (3)

Prerequisite: Chem 461; ChEn 531 or equivalent.

Fundamentals of statistical mechanics and their application to calculating thermodynamic and transport properties of fluids and fluid mixtures.

633. Combustion Processes. (3)

Prerequisite: ChEn 533 or equivalent.

Fundamentals of transport processes in reacting flow systems with specific applications of various combustion processes.

635. Advanced Topics in Catalysis and Kinetics. (1-3)

Prerequisite: ChEn 535, Math 321.

Specialty topics in catalysis and kinetics, including catalyst deactivation, catalyst characterization, reactor design, and reaction modeling.

641. Combustion Modeling. (3)

Prerequisite: ChEn 633; Math 311 or ChEn 541.

Theory of combustion systems and quantitative procedures for computing performance of combustion chambers. Applications include turbulent combustion of gases, sprays, and particulates.

674. Advanced Thermodynamics. (2)

Prerequisite: ChEn 531 or equivalent.

Advanced topics in thermodynamics, including electrolytes, phase equilibrium modeling, nonequilibrium thermodynamics, and calorimetry.

678. Colloid and Surface Phenomena. (3)

Prerequisite: ChEn 578 or instructor's consent.

Introduction to the theory and applications of colloid and surface science. Topics include sedimentation, diffusion, colloid thermodynamics, viscosity, surface energy, adsorption, and flocculation.

685. Chemical Engineering for Chemistry Students. (6)

Intensive treatment of fundamentals of material and energy balances, fluid flow, and heat and mass transfer, with application to design and analysis of engineering systems.

691R. Seminar for Master's Students. (0.5)

Technical presentations by graduate students, faculty members, and guests.

693R. Special Topics—Graduate. (1-6)**697R. Special Problems—Graduate. (2-6)****698R. Master's Project. (1-6)****699R. Master's Thesis. (1-6)****733. Coal Combustion. (3)**

Prerequisite: instructor's consent.

Fundamentals of coal combustion and gasification processes, including particle mechanics, devolatilization, heterogeneous oxidation, radiative heat transfer, and combustion of coal in practical flames.

791R. Seminar for Doctoral Students. (0.5)**793R. Selected Topics in Chemical Engineering. (1-3)**

Topics vary according to student-faculty research interests.

799R. Doctoral Dissertation. (1-9)**FACULTY**

BARTHOLOMEW, CALVIN H., *Professor.* PhD, Stanford University, 1972. Catalysis.

BECKSTEAD, MERRILL W., *Professor.* PhD, University of Utah, 1965. Combustion of Solid Propellants.

FLETCHER, THOMAS H., *Associate Professor.* PhD, Brigham Young University, 1983. Combustion and Transport Processes in Reacting Flow Systems.

HARB, JOHN N., *Associate Professor.* PhD, University of Illinois, 1988. Electrochemical Engineering; Coal Combustion.

HECKER, WILLIAM C., *Associate Professor.* PhD, University of California, Berkeley, 1982. Catalysis; Chemical Kinetics.

HEDMAN, PAUL O'DELL, *Professor.* PhD, Brigham Young University, 1973. Combustion/Gasification; Fossil Energy.

OSCARSON, JOHN L., *Associate Professor.* PhD, University of Michigan, 1985. Vapor-Liquid Equilibria; Separation Processes.

PITT, WILLIAM G., *Associate Professor.* PhD, University of Wisconsin, Madison, 1987. Surface Chemistry; Biomedical Polymers.

ROWLEY, RICHARD L., *Professor.* PhD, Michigan State University, 1978. Liquid-Mixture Transport Properties; Thermodynamics.

SMOOT, L. DOUGLAS, *Professor.* PhD, University of Washington, 1960.

Combustion, Coal Gasification.

SOLEN, KENNETH A., *Professor.* PhD, University of Wisconsin, Madison, 1974. Blood-Material Interactions; Blood Filtration.

TERRY, RONALD E., *Professor.* PhD, Brigham Young University, 1976. Enhanced Oil Recovery; Thermodynamics.

WILDING, W. VINCENT, *Associate Professor.* PhD, Rice University, 1985. Applied Thermodynamics.

CHEMISTRY AND BIOCHEMISTRY

Chair: Francis R. Nordmeyer

Graduate Coordinator: Milton L. Lee

C-100 BNSN

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THE PROGRAM OF STUDIES

Chemistry is fundamental in our physical and biological world. The principles and applications of chemistry are diverse, interesting, and challenging. The graduate program in chemistry and biochemistry at BYU prepares developing scientists to enjoy the excitement of chemistry and to contribute in diverse circumstances where chemical knowledge and skill are needed.

Thirty-four faculty are the foundation of an excellent graduate program. The department recently occupied the new 190,000-square-foot Benson Science Building, which provides comfortable, modern laboratories. Several million dollars' worth of instrumentation is available and constantly being replaced or upgraded to support cutting-edge research.

About sixty graduate students provide an essential and dynamic atmosphere for research progress and stimulating discussion. Twenty post-doctoral students and visiting scientists add depth and diversity to the intellectual atmosphere. About seventy undergraduate research assistants also bring significant strength and enthusiasm to research projects.

Additional information about faculty members and their research interests are found in a color brochure available from the department office at the address and phone number given above.

The Department of Chemistry and Biochemistry offers four degrees: Chemistry—MS, Biochemistry—MS, Chemistry—PhD, and Biochemistry—PhD.

Areas of emphasis include: Analytical Chemistry, Biochemistry, Inorganic Chemistry, Organic Chemistry, and Physical Chemistry.

About 80 percent of the graduate students are in the PhD program, and they complete their work in four to five years. MS program students complete their work in one and a half to two and a half years.

Admission and Entry.

- Application materials (for all degree programs): completed Brigham Young University Application for Admission to Graduate Study and official results of the GRE general test and the GRE subject chemistry or biochemistry test. Official TOEFL examination results are also required from persons whose first language is not English.
- Semesters of entry and application deadlines: fall, February 1 (U.S. and international); winter, August 15 (U.S. only).
- Prerequisite requirements: applicants should have completed a baccalaureate degree in chemistry or biochemistry or have equivalent preparation in chemistry and biochemistry.
- Placement examinations: written examinations of a new student's undergraduate preparation in five areas of chemistry are given during the week preceding the first semester of enrollment. Deficiencies revealed by the exams are removed by repeating an exam in the area of deficiency.

Chemistry—MS

The chemistry MS degree provides specialized study and research on an advanced level. It includes about one year of course work beyond the bachelor's degree and the development of a significant research project presented in a thesis. The MS student will study

in one of the four chemistry areas of emphasis or develop, with an advisor, an interdisciplinary program. The added preparation in theory and practice allows the chemical scientist to assume responsibility and supervision beyond that normally given with bachelor's level study. The MS degree is adequate preparation for some junior college teaching positions. This degree also typically brings a salary increase above that for a baccalaureate degree. The master's degree is generally not necessary as a preparatory step for the PhD degree.

Requirements for Degree.

- Credit hours (30): 24 hours of course work and research plus 6 thesis hours (Chem 699R).
- Required courses: Chem 594R (every semester in residence) and other courses as specified by committee.
- Annual progress review and/or examination.
- Thesis.
- Final oral examination consisting of two parts: (A) public presentation of original research described in thesis; (B) comprehensive examination on course work, research, and thesis.

Biochemistry—MS

The biochemistry MS degree provides specialized study on an advanced level. The degree includes about one year of course work beyond the BS degree and a thesis based upon a significant research project. The research will be in areas of biochemical emphasis, such as molecular genetics, enzymology, or protein structure and function. The added preparation in theory and practice allows the MS biochemist to assume responsibility and supervision beyond that normally given a BS or BA biochemist, with a concomitant salary increase above that for a baccalaureate degree. The MS degree is adequate preparation for some junior college teaching positions. It is generally not a prerequisite for a PhD degree program.

Requirements for Degree.

- Credit hours (30): 24 hours of course work and research plus 6 thesis hours (Chem 699R).
- Required courses: Chem 582, 584, 594R (every semester in residence), and other courses as specified by committee.
- Annual progress review and/or examination.
- Thesis.
- Final oral examination consisting of two parts: (A) public presentation of original research described in thesis; (B) comprehensive examination on course work, research, and thesis.

Chemistry—PhD

The chemistry PhD degree prepares a scientist to contribute on the creative front of chemical science. A student's study may fall within one of the chemistry areas of emphasis or it may involve an interdisciplinary focus. Some courses on advanced topics related to the student's professional goals will be taken, but study for the PhD degree is primarily a research experience that is to be reported in a dissertation and in the scientific literature. The PhD chemist is prepared for a wide range of career choices and will be expected to act with considerable independence and enjoy major responsibilities. A new PhD chemist may seek employment in industry, government agencies, or the university or college setting. The PhD will typically bring a substantial salary increase in comparison to a bachelor-level degree.

Requirements for Degree.

- Credit hours (54): 36 hours of course work and research plus 18 dissertation hours (Chem 799R). (With departmental approval, some credit from an MS degree may be applied toward this requirement.)
- Required courses: Chem 594R (every semester in residence) and other courses as specified by committee.
- Annual progress review and/or examination.
- Comprehensive qualifying exam: written and/or oral.
- Dissertation.

- Final oral examination consisting of two parts: (A) public presentation of original research described in dissertation; (B) oral examination, primarily on dissertation.

Biochemistry—PhD

The biochemistry PhD degree prepares a scientist to perform and to supervise creative research in biochemistry and molecular biology. The PhD degree requires some course work, but the emphasis is primarily on original, creative research leading to a dissertation and to publications in scientific journals. The PhD biochemist is prepared for a wide range of career opportunities that involve independent thinking and supervisory responsibilities in industry, government, or academia. PhD biochemists usually make a substantially higher salary than BS or BA biochemists.

Requirements for Degree.

Required courses: Chem 582, 584, 594R, (every semester in residence), and other courses as specified by committee.

FINANCIAL ASSISTANCE

All students admitted to the graduate program in the department who request financial aid are granted tuition for all required graduate courses and a graduate assistantship. These awards are granted on a continuing basis as long as satisfactory progress is being made toward the degree. This financial assistance allows students to be involved full-time in their graduate program, which will include research and course work and may also include teaching and laboratory assistant assignments.

Other types of financial aid such as internships, scholarships, and student loans may also be available to students who qualify. More information may be obtained from the department office and from the Financial Aid Office.

The department relies on its graduate students to fill many assignments in laboratory and recitation instruction.

Unless excused by the faculty, a graduate student is expected to be a teaching assistant for at least two semesters for twenty hours a week during residency toward the doctoral degree. Master's degree candidates are expected to teach half this amount.

RESOURCES AND OPPORTUNITIES

State Centers of Excellence. The state of Utah has established and funded a number of research and development Centers of Excellence. These centers promote joint efforts between the university and industry in the development of new technologies. The Department of Chemistry and Biochemistry houses two of these centers, one for chemical separations and the other for supercritical fluid separation technologies.

Chemical Separations Center of Excellence. The chemical separations group is engaged in designing and building chemical separations systems that can selectively bind specific chemical structures with certain ions or molecules. The group hopes, among other things, to find ways to separate enantiomeric forms of chemical compounds and trace metals from solutions.

Advanced Supercritical Fluid Separation Technologies Center of Excellence. The center is developing and testing instrumentation for the use of supercritical fluids in analytical chemistry applications. Capillary supercritical fluid chromatography was first successfully demonstrated at BYU. Researchers are pursuing improvements to ensure reliability, instrument simplicity, and improved methods of sample introduction, separation, and detection. The center has recently extended research into new analytical detection techniques, including radiofrequency plasma emission spectrometry and time-of-flight mass spectrometry.

Center for Thermodynamics. The center involves chemical thermodynamics research in the Departments of Chemistry and Biochemistry and

Chemical Engineering and also involves faculty and students in other areas such as physics, engineering, biology, and agricultural sciences. The center facilitates the exchange of ideas and information and coordinates the use of sophisticated instruments used to make thermodynamic measurements. Calorimetry is an especially strong part of this program, which also includes research in phase equilibria, solution thermodynamics, and electrochemistry. Eighteen faculty and other full-time personnel are formally affiliated with the center and are involved in thermodynamic research.

Cancer Research Center. The objective of the BYU Cancer Research Center is to make significant scientific contributions toward the control and cure of cancer. Intense investigations of oncogenes and their relation to the development of cancer represents a major activity within the center. Faculty and students from the Department of Chemistry and Biochemistry and from the College of Biology and Agriculture contribute their expertise.

A color brochure entitled "Graduate Studies in Chemistry and Biochemistry" includes more detailed information about the research programs and interests of each faculty member. This publication also includes a short summary of research instruments and facilities available to graduate students. The department office will provide this brochure and additional information about admission to the graduate program and the work of graduate students as students progress toward an advanced degree. We invite you to contact us by letter, fax, or E-mail. (Please see preceding address information.)

COURSE DESCRIPTIONS

501. Chemical Handling and Safe Laboratory Practices. (0.5)

Survey of appropriate methods in handling hazardous materials and disposing of waste. Legal rights and requirements. Safety in chemistry laboratory work.

514. Inorganic Chemistry. (3)

Prerequisite: Chem 461, 462; or 461, 468.

In-depth treatment of theoretical concepts in inorganic chemistry and the descriptive chemistry of some of the elements.

518. Inorganic Synthesis. (2)

Prerequisite: Chem 501 or concurrent registration; Chem 514.

Syntheses that demonstrate a variety of techniques and a range of inorganic materials.

523. Instrumental Analysis. (3)

Prerequisite: Chem 464; 501 or concurrent registration.

Modern instrumental methods and basic principles of instrumentation. Laboratory experience with a variety of instruments.

524. Analytical Chemistry. (2)

Prerequisite: Chem 523 or equivalent.

Advanced theory of measurements and techniques in chemical analysis.

552. Advanced Organic Chemistry. (3)

Prerequisite: Chem 351, 352; 461, 462.

Emphasizes physical aspects of organic chemistry; mechanisms, reaction intermediates, bonding, stereochemical and stereoelectronic effects, molecular orbital theory, Lewis acidity and basicity.

553. Advanced Organic Chemistry. (3)

Prerequisite: Chem 351, 352.

Synthetic aspects of organic chemistry; oxidations, reductions, concerted reactions, stereoselectivity, synthetic equivalents, protecting groups. Examples of natural product total synthesis.

561. Chemical Thermodynamics. (3)

Prerequisite: Chem 461, 462.

Development of the principles of chemical thermodynamics, including laws, pure materials, mixtures, equilibria, and elementary statistical mechanics.

563. Reaction Kinetics. (3)

Prerequisite: Chem 461, 462.

Theoretical aspects of chemical kinetics in the gas phase and in solution. Rates and mechanisms in solution, rapid reactions, and other topics.

564. Nuclear Chemistry and Radiochemistry. (2-3)

Prerequisite: Chem 461, 462.

Introduction to nuclear structure, radioactivity, nuclear spectroscopy, and nuclear reactions, emphasizing applications in chemistry.

565. Introduction to Quantum Chemistry. (3)

Prerequisite: Chem 461, 462.

Introduction to physical and mathematical aspects of quantum theory, emphasizing application of the Schrödinger wave equation to chemical systems.

569. Fundamentals of Spectroscopy. (3)

Prerequisite: Chem 461, 462; or 461, 468; 523 or equivalent).

Atomic and molecular spectroscopy and application of group theoretical concepts. Types of experiments and interpretation of data.

582. Biochemistry of the Nucleic Acids. (3)

Prerequisite: Chem 481.

Second-semester biochemistry. Nucleic acid biochemistry and molecular biology: nucleotide metabolism, chromosome and chromatin structure, DNA structure and replication, RNA transcription and gene expression, protein synthesis and regulation, eukaryotic gene systems.

584. Biochemistry Laboratory. (2)

Prerequisite: Chem 481.

Modern research instrumentation and current biochemical research procedures. Enzyme isolation and characterization, protein sequencing, nucleic acid manipulations.

586. Recombinant DNA. (2)

Prerequisite: Chem 481.

Laboratory course covering major techniques involved in isolation, amplification, and cloning of recombinant DNA. Variety of cloning systems and methods of identification introduced.

594R. General Seminar. (0.5)

Research topics presented by faculty and visiting scientists. Required every semester in residence.

596R. Special Topics in**Chemistry. (1-3)**

Prerequisite: Chem 351, 352; 367 or 461.

Subjects that may be offered include:

- Atmospheric Chemistry
- Ion Chromatography
- Organic Spectroscopic Identification

619R. Advanced Topics in Inorganic Chemistry. (1-3)

Prerequisite: Chem 514 or equivalent.

The following topics are rotated:

- Chemistry of the Main Group Elements. F alt. yr.
- Chemistry of the Transition Elements. F alt. yr.

629R. Advanced Topics in Analytical Chemistry. (1-3)

Prerequisite: Chem 523 or equivalent.

The following topics are rotated:

- Separation Methods of Analysis. W alt. yr.
- Spectroscopic Methods of Analysis. W alt. yr.

659R. Advanced Topics in Organic Chemistry. (1-3)

Prerequisite: Chem 552 or equivalent.

The following topics are rotated:

- Organic Heterocyclic Compounds. W alt. yr.
- Organometallic Chemistry. W alt. yr.
- Organic Photochemistry. F alt. yr.

669R. Advanced Topics in Physical Chemistry. (2-3)

Prerequisite: Chem 561 and/or 565 or equivalent.

The following topics are rotated:

- Advanced Chemical Thermodynamics. W alt. yr.
- Quantum Chemistry. Every 3d yr. on dem.

689R. Advanced Topics in Biochemistry. (1-3)

Prerequisite: Chem 582 or equivalent.

The following topics are rotated:

- Biomembranes and Bioenergetics. F alt. yr.
- Metabolic Integration. F alt. yr.
- Proteins and Enzymes. W alt. yr.

697R. Master's Candidate Research. (1-6)

Prerequisite: Chem 501 or concurrent registration.

699R. Master's Thesis. (1-9)**719R. Selected Topics in Inorganic Chemistry. (1-3)**

Subjects that may be offered include:

- Bioinorganic Chemistry
- Coordination Chemistry
- Environmental Chemistry

729R. Selected Topics in Analytical Chemistry. (1-3)

Subjects that may be offered include:

- Atomic Spectroscopy
- Chromatography
- Electrochemical Methods of Analysis
- Molecular Spectroscopy
- X-Ray Structure Analysis

759R. Selected Topics in Organic Chemistry. (1-3)

Subjects that may be offered include:

- Medicinal Chemistry
- Natural Products
- Nucleoside and Nucleotide Chemistry
- Stereoselective Synthesis

769R. Selected Topics in Physical Chemistry. (1-3)

Subjects that may be offered include:

- Advanced Group Theory
- Advanced Techniques in Magnetic Resonance
- Calorimetry
- Molecular Structure and Spectroscopy
- Solid-State Chemistry
- Statistical Mechanics

789R. Selected Topics in Biochemistry. (1-3)

Subjects that may be offered include:

- Biochemistry of Retroviruses
- Biologically Active Peptides
- Biopolymer Conformational Analysis
- Gene Expression in Higher Plants
- Metabolism
- Molecular Biology of Cancer
- Transmembrane Signalling

797R. Doctoral Candidate Research. (1-9)

Prerequisite: Chem 501 or concurrent registration.

799R. Doctoral Dissertation. (1-9)**FACULTY**

BERGES, DAVID A., *Associate Professor.* PhD, Indiana University, 1967.

Biochemistry; Organic Chemistry.

BILLS, JAMES L., *Professor.* PhD, Massachusetts Institute of Technology, 1963. Inorganic Chemistry.

BOERIO-GOATES, JULIANA, *Professor.* PhD, University of Michigan, 1979. Physical Chemistry.

BRADSHAW, JERALD S., *Professor.* PhD, University of California, Los Angeles, 1963. Organic Chemistry.

DALLEY, N. KENT, *Professor.* PhD, University of Texas, Austin, 1968. Analytical Chemistry.

DEARDEN, DAVID V., *Assistant Professor.* PhD, California Institute of Technology, 1989. Analytical/Physical Chemistry.

EATOUGH, DELBERT J., *Professor*. PhD, Brigham Young University, 1967. Physical and Atmospheric Chemistry.

ELTON, TERRY S., *Associate Professor*. PhD, Washington State University, 1986. Biochemistry.

FARNSWORTH, PAUL B., *Professor*. PhD, University of Wisconsin, Madison, 1981. Analytical Chemistry.

FLEMING, STEVEN A., *Associate Professor*. PhD, University of Wisconsin, Madison, 1984. Organic Chemistry.

GOATES, STEVEN R., *Professor*. PhD, University of Michigan, 1981. Analytical Chemistry.

GRANT, DAVID M., *Professor*. PhD, University of Utah, 1958. Physical Chemistry.

HANSEN, LEE DUANE, *Professor*. PhD, Brigham Young University, 1965. Inorganic Chemistry.

HARRISON, ROGER G., *Assistant Professor*. PhD, University of Utah, 1993. Inorganic Chemistry.

KASPAR, ROGER L., *Assistant Professor*. PhD, University of Washington, 1991. Biochemistry.

LAMB, JOHN D., *Professor*. PhD, Brigham Young University, 1978. Inorganic Chemistry.

LEE, MILTON L., *Professor*. PhD, Indiana University, 1975. Analytical Chemistry.

MANGELSON, NOLAN F., *Professor*. PhD, University of California, Berkeley, 1967. Physical Chemistry.

MANGUM, JOHN HARVEY, *Professor*. PhD, University of Washington, 1963. Biochemistry.

NORDMEYER, FRANCIS R., *Professor*. PhD, Stanford University, 1967. Inorganic Chemistry.

OTT, J. BEVAN, *Professor*. PhD, University of California, Berkeley, 1959. Physical Chemistry.

OWEN, NOEL L., *Professor*. PhD, Cambridge University, 1964; DSc, University of Wales, 1983. Physical Chemistry.

PETERSON, MATT A., *Assistant Professor*. PhD, University of Arizona, 1992. Organic Chemistry.

PUGMIRE, RONALD J., *Professor*. PhD, University of Utah, 1966. Physical Chemistry.

ROBINS, MORRIS J., *Professor*. PhD, Arizona State University, 1965. Organic Chemistry.

SAVAGE, PAUL B., *Assistant Professor*. PhD, University of Wisconsin, 1993. Organic Chemistry.

SHIRTS, RANDALL B., *Associate Professor*. PhD, Harvard University, 1979. Physical Chemistry.

SIMMONS, DANIEL L., *Associate Professor*. PhD, University of Wisconsin, Madison, 1986. Biochemistry.

SMITH, MARVIN A., *Professor*. PhD, University of Wisconsin, Madison, 1964. Biochemistry.

THORNE, JAMES M., *Professor*. PhD, University of California, Berkeley, 1966. Physical Chemistry.

WATT, GERALD D., *Professor*. PhD, Brigham Young University, 1966. Inorganic Chemistry.

WILLARDSON, BARRY M., *Assistant Professor*. PhD, Purdue University, 1990. Biochemistry.

WOOLLEY, EARL M., *Professor*. PhD, Brigham Young University, 1969. Analytical/Physical Chemistry.

ZIMMERMAN, S. SCOTT, *Associate Professor*. PhD, Florida State University, 1973. Biochemistry.

CIVIL AND ENVIRONMENTAL ENGINEERING

Chair: T. Leslie Youd
Graduate Coordinator: A. Woodruff Miller

368-K CB
 PO Box 24081
 Provo, UT 84602-4081
 (801) 378-2811

THE PROGRAM OF STUDIES

Three degrees are offered through the Department of Civil and Environmental Engineering: Civil and Environmental Engineering—MS, Engineering Management—MEM, and Engineering—PhD. The department also offers an integrated BS/master's program.

The Department of Civil and Environmental Engineering admits approximately sixty students each year into its programs.

Civil and Environmental Engineering—MS

The MS degree is awarded to students who have mastered professional training in selected areas of civil engineering. Such training is gained through graduate course work which, unlike bachelor's course work, consists of elective courses and directed research or design.

Students pursuing the thesis option gain the added dimension of participating in research work (usually funded) at the cutting-edge of the profession. This research work culminates in a high-quality thesis presentation. Alternatively, the student may choose the project option and complete a less intensive research or design study. The degree normally requires one year beyond the bachelor's degree.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and May 15 (U.S.); winter, June 30 (international) and September 15 (U.S.); spring, October 31 (international) and February 15 (U.S.); summer, December 31 (international) and March 15 (U.S.).
- Application requirements: there is no entrance examination for applicants who hold a BS from U.S. or Canadian schools. However, international students must submit scores for the GRE general test, advanced engineering subject test, and TOEFL (573 minimum).
- Prerequisite: baccalaureate degree in civil engineering or its equivalent. Students with other backgrounds will also be considered.

Requirements for Degree.

- Credit hours:
Thesis Program: 34 minimum approved hours including 6–9 thesis hours (CEEn 699R).
Project Program: 34 minimum approved hours including a maximum of 3 project hours.
- Required course: CEEn 691R each fall and winter semester; no more than 1 hour can count toward the minimum hours required. Consult department for details.
- Study list: the graduate study list must be submitted during the first semester of graduate study.
- Residency requirements: residency is required for the major part of the work toward the master of science degree. This work must be completed under the specific direction of a graduate faculty member while the student is in residence at BYU (at least two consecutive full-time semesters). "In residence" is defined as (1) being registered for credit as a graduate student and (2) living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty. Further, all work applying toward any master's project or thesis must be completely open for university review and publication. Any exceptions to the above must

be supported by written approval from the department and college and obtained in advance of any work being performed.

- Examinations: (A) successful completion of the fundamentals of engineering examination (FE); (B) oral defense of thesis or oral presentation of project.

Engineering Management—MEM

The MEM is jointly sponsored by the Marriott School of Management and the College of Engineering and Technology. As such, the program incorporates increased technical learning in civil and environmental engineering with those skills needed to become an efficient and effective manager. With this focus the type of career preparation gained will allow the student to remain in professional engineering activities and yet be capable of working with managers or becoming a manager of technical activities.

The majority of MEM graduates go out as engineers but more fully prepared to move into management positions. The program offers the student an increased awareness of the interrelationship of engineering, marketing, production, finance, operations management, accounting, and other essential managerial skills.

MEM students who wish to take civil and environmental engineering courses for a specialization in this area should consult the graduate coordinator to be assigned an advisor.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 1 (U.S. and international). Fall semester entrance is strongly recommended. Entry spring and summer terms is available but will extend the length of the program.
- Application requirements: the entrance examination is the GRE general test for applicants from non-ABET (Accreditation Board for Engineering and Technology, Inc.) accredited institutions. U.S. appli-

cants must prove to the department that they have passed the state fundamentals of engineering (FE, formerly EIT) examination, which the state of Utah (or any other state) offers each April and October. Indicate in writing a desire to be considered for the program. Submit application to Graduate Admissions, B-356 ASB, PO Box 21341, Provo, UT 84602-1341.

- Prerequisite: baccalaureate degree in engineering or technology.

Requirements for Degree.

- Credit hours (40): minimum 40 course work credit hours.
- Basic curriculum requirements: *fall semester*—Mgt 501 (3), 561 (3), EngT 500 (1), technical electives (6); *winter semester*—Mgt 511 (3), 541 (3), 562 (3), EngT 501 (1), technical elective (3); *spring term*—Mgt 551 (3), technical elective (3); *summer term*—Mgt 580 (3), 565 (2), technical elective (3). See p. 116 for course descriptions.

Financial Assistance.

Scholarship funds are available from the Jerry Christiansen Scholarship funds.

Engineering—PhD

The PhD is awarded to candidates who have made a significant contribution to knowledge in a particular specialization of civil engineering. Such a contribution is achieved through research that involves a thorough review of applicable literature, completion of carefully planned work, and a high-quality presentation of the new knowledge: the dissertation. Adequate course work is necessary to provide a foundation of expertise for quality research. The degree normally requires three years beyond the bachelor's degree or two years beyond the master's degree.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and May 15 (U.S.); winter, June 30 (international) and September 15 (U.S.); spring, October 31 (in-

ternational) and February 20 (U.S.); summer, December 31 (international) and April 15 (U.S.)

- Application requirements: there is no entrance examination for applicants who hold a BS or MS degree from U.S. or Canadian schools. However, international students must submit scores for the GRE general test, advanced engineering subject test, and TOEFL (573 minimum).
- Prerequisite: BS degree (or equivalent) in civil engineering from a program accredited by the Accreditation Board for Engineering and Technology (ABET) with a minimum 3.4 GPA in the last 60 hours of technical and scientific course work. A BS in any other field requires provisional admission. Consult the department for specific details.

Requirements for Degree.

- Credit hours: minimum 68 semester hours, at least 50 of which must be course work beyond the baccalaureate degree, plus 18 hours of dissertation (CEEn 799R).

Candidates Without a Master's Degree: 50 hours, a minimum 38 of them in graduate-level courses. At least 12 hours of the 50 must be in advanced mathematics, statistics, or science (a portion of which may be upper-division undergraduate level, with specific departmental approval) and a minimum 18 hours of dissertation (CEEn 799R).

Candidates with a Master's Degree: with committee approval up to 20 hours of previous graduate work, including 4 hours of thesis, may apply toward the doctorate. In addition, other courses taken in the master's program may apply toward the required 12 hours of advanced mathematics, statistics, or science.

- Required course: CEEEn 691R (graduate seminar) each fall and winter semester; no more than 2 hours can count toward minimum hours required.
- Study list: the graduate study list must be submitted during the first semester of doctoral study.
- Residency requirements: see residency requirements listed in the

preceding Civil and Environmental Engineering—MS section.

- Comprehensive qualifying examination: students must take and pass a written comprehensive qualifying examination based on graduate course work. After passing this examination, the student is accepted to candidacy for the doctoral degree. The examination is offered twice a year and is generally taken at the end of the first two semesters of the graduate program.
- Prospectus: students must submit and successfully defend a written prospectus on their proposed dissertation research topic at least one year before completion of the degree.
- Dissertation.
- Oral defense of dissertation.

Integrated Master's Program—BS/MS

Students who desire to obtain a master's degree in engineering, and who have been accepted to a department professional program, may elect to enter the integrated master's program during the junior year of the engineering curriculum. The purpose of the program is to afford greater flexibility in scheduling course work than is normally available through a traditional BS degree followed by an MS degree program.

In this program the BS degree may be received before or simultaneously with the MS degree (normally five years from freshman matriculation). Specific requirements are the same as those listed for the civil and environmental engineering MS but include the following:

Admission and Entry.

- Submit formal application for admission to the Office of Graduate Studies before completion of final 30 hours of graduate degree.
- Required GPA: cumulative of 2.5 or better in civil and environmental engineering program at end of sophomore year.

Requirements for Degree.

- Submit final study list during first semester of registration as a graduate student.
- Cumulative 3.0 GPA or above in all master's degree courses.

FINANCIAL ASSISTANCE

Departmental Scholarships. Master's or PhD candidates are eligible for scholarships each year. Applications may be obtained in March from the departmental office; the awards are given in mid-April for the next fall. Selection is based on scholastic merit (primarily using the GPA of the last 60 hours on a verified transcript); selection is also based upon need. These scholarships may be received in addition to any assistantships or privately endowed awards unless the total financial aid package exceeds the scholarship limit stipulated by the university.

Research Assistantships. Several of the faculty obtain funds from both off-campus and on-campus sources to support research assistants. These awards support students at the current pay rate for 20 hours per week. The research work normally applies toward completion of the student's thesis or dissertation.

Teaching Assistantships. All graduate students are eligible to be TAs. The assistantships are usually for 10 hours per week and consist of teaching and grading courses. Graduate applicants are given priority over undergraduates.

Privately Endowed Awards. The department currently has access to the Caleb Tanner Scholarship for a student pursuing graduate work in water resources engineering. This is a cash award of \$2,000 to \$3,000 for one year. Applications are available in March.

MEM Scholarships. Interested students should make an appointment with the MEM director via the secretary in the dean's office. Telephone (801) 378-4326.

RESOURCES AND OPPORTUNITIES

The College of Engineering and Technology, of which the Department of Civil and Environmental Engineering is a part, has experienced rapid growth in funded research during the past decade. In recent years the college research budget has continued to grow steadily, with the budget for the 1994-95 fiscal year exceeding \$9 million. A national leader in several areas, college research organizations now have two centers: the Advanced Combustion Engineering Research Center (ACERC) and the Advanced Composites Manufacturing and Engineering Center (ACME). This includes one of the prestigious National Science Foundation engineering research centers, four research laboratories, and two state-funded Centers of Excellence. More than half the faculty participate in research endeavors, and a number have gained international recognition for their work. Listed below are the resources most pertinent to the Department of Civil and Environmental Engineering:

Engineering Computer Graphics Laboratory (ECGL). This laboratory was formalized in 1985 following a decade of research and development in computer graphics under the leadership of Henry N. Christiansen of the Civil Engineering Department. During that period the faculty and graduate students associated with the lab have created computer graphics and structural analysis software that has been distributed worldwide.

The laboratory maintains a sizeable array of hardware that equips the comprehensive computer graphics research facility. Laboratory objectives include the promotion of an atmosphere of academic research related to computer-aided engineering and the development of procedures and computer codes, with special emphasis on computer graphics.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500. (CEEn-MeEn) Design and Materials Applications. (3)

Prerequisite: CEEEn 203; MeEn 372 or CEEEn 321

Applied and residual stress; materials selection; static, impact, and fatigue strength; fatigue damage; surface treatments; elastic deflection and stability—all as applied to mechanical design.

501. (CEEn-MeEn) Stress Analysis and Design of Mechanical Structures. (3)

Prerequisite: CEEEn 321 or MeEn 372.

Stress analysis and deflection of structures; general bending and torsion with computer applications to mechanical and aerospace structure design.

502. (CEEn-MeEn) Plasticity and Fracture Mechanics. (3)

Prerequisite: CEEEn-MeEn 503.

Continuum theory of plasticity, linear elastic fracture mechanics, introduction to structured continuum theories for polycrystalline media.

503. (CEEn-MeEn) Theory of Elasticity. (3)

Prerequisite: CEEEn 203, Math 321.

Tensor notation, stress and deformation tensors, constitutive equations, field equations; plane-stress/plane strain, axisymmetric, thermoelasticity, and large deformation problems.

504. (CEEn-MeEn) Matrix Structural Analysis. (3)

Prerequisite: CEEEn 321 or MeEn 372.

Matrix notation, principle of virtual forces, flexibility method, principle of virtual displacements, stiffness method, and general purpose computer programs for structural analysis.

505. Materials, Uses, and Properties of Concrete. (3)

Prerequisite: instructor's consent.

Manufacturing and testing of cements; concrete materials and concrete mix design; techniques of concrete handling, placing, and treatment, including laboratory work.

506. (CEEn-MeEn) Introduction to Finite Element Method. (3)

Prerequisite: CEEEn 321 or MeEn 372.

Finite element stress analysis; mathematical foundations; simplex, isoparametric, bending, and axisymmetric elements; basic 2-D and 3-D modeling techniques; use of FEA computer software and hardware.

507. (CEEn-MeEn) Advanced Finite Element Analysis. (3)

Prerequisite: CEEEn-MeEn 506.

Complex 3-D finite modeling, multiple element types, and mesh generation techniques. Application to thermal stress, nonlinear materials, and large deformations. Use of CAE software.

508. (CEEn-MeEn) Dynamics of Structures and Mechanical Systems. (3)

Prerequisite: Math 321; CEEEn 321 or MeEn 372; CEEEn-MeEn 504.

Dynamic analysis of single and multi-degree-of-freedom systems, Ritz approximation, frequency domain analysis, geometric nonlinearity, and material nonlinearity.

509. (CEEn-MeEn) Spectral Analysis of Dynamic Systems. (3)

Prerequisite: Math 321, CEEEn 204.

Vibrations of elastic bodies and of systems with multiple degrees of freedom; random vibration. Computer-aided vibration testing and analysis.

513. (CEEn-Geog) Photogrammetry and Remote Sensing. (3)

Prerequisite: CEEEn 113.

Using data obtained from the visible range (photographs) and broader ranges (radar, microwaves, infrared, remote, etc.) of the electromagnetic spectrum to solve engineering problems with mapping procedures; photo and electronic data interpretation.

524. Design of Bridge Structures. (3)

Prerequisite: CEEEn 341, 424, 504.

Design of bridge composite; continuous beam and girder bridges including piers, abutments, floor systems, and bearings; field trips to observe bridge construction and fabrication.

526. Prestressed Concrete. (3)

Prerequisite: CEEEn 424, 504.

Basic theory, methods of pre- and post-tensioning, and details of design and fabrication applications to continuous structures.

529. Timber Design. (3)

Prerequisite: CEEEn 321.

Timber species, composition, and grades; design of beams, straight and tapered glue-lam girders, columns, connections, trusses, shear walls, and structural systems.

531. Water Resources Engineering. (3)

Prerequisite: CEEEn 431, 433.

Advanced hydrologic and hydraulic principles in planning and designing irrigation, drainage, flood control, and other water resource facilities.

535. Hydraulic Design of Channels and Control Structures. (3)

Prerequisite: CEEEn 431, 433.

Design of water conveyance channels and control structures, including siphons, chutes, weirs, flumes, dams, spillways, and outlet works.

540. Geo-Environmental Engineering. (3)

Prerequisite: CEEEn 341.

Geotechnical aspects of environmental engineering. Topics include municipal and hazardous solid waste landfill design, and characterization and remediation techniques for contaminated soil and groundwater.

542. Foundation Engineering. (3)

Prerequisite: CEEEn 341 or equivalent.

Soil investigation, bearing capacity and settlement, design of spread footings, combined footings, mat foundations, retaining walls, pile foundations, and drilled shafts.

543. Earth- and Rock-Fill Structures. (3)

Prerequisite: CEEEn 341 or equivalent.

Design and construction of earth- and rock-fill dams, including selecting dam sites and materials, and applying seepage and pore pressure studies, shearing strength data, stability analysis, and construction controls.

545. Geotechnical Analysis of Earthquake Phenomena. (3)

Prerequisite: CEEEn 321, 341.

Earthquake magnitude and intensity potential; design ground motions, elementary dynamics of structures; response spectra; building code provisions; liquefaction and ground failure.

550. Water Quality Management. (3)

Prerequisite: CEEEn 351.

Philosophies, objectives, and methods of water quality management, including impact of various uses on water quality and behavior of pollutants in receiving waters.

555. Sanitary Engineering Analysis. (3)

Prerequisite: CEEEn 351.

Techniques for chemical and biological analysis of major organic and inorganic constituents of water, sewage, and industrial wastes.

561. Geometric Design of Highways. (3)

Prerequisite: CEEEn 361.

Designing visual aspects of highways; highway classification, design controls and criteria, and design elements; vertical and horizontal alignment, cross sections, intersections, and interchanges; capacity analysis.

562. Characteristics and Operations of Traffic Engineering. (3)

Prerequisite: CEEEn 361 or equivalent.

Traffic flow theory, operations and characteristics, including drivers and vehicles, parking facilities, at-grade intersections, channelization, traffic control devices, signals.

563. Pavement Design. (3)

Prerequisite: CEEEn 361.

Properties and selection of pavement components, including soils, stabilized soil, base, subbase, subgrade, and bituminous materials, along with design of rigid and flexible pavements.

565. Transportation in Urban Planning. (3)

Prerequisite: instructor's consent.

Street classification and function; design elements of streets, intersections, and access drives; transportation planning studies; land use transportation interrelationships and improvement alternatives.

570. (CEEEn-MeEn) Computer-Aided Engineering Software Design. (3)

Prerequisite: FORTRAN, or C, or similar computer language background.

Programming techniques and structure for interactive engineering design software. Use of engineering library utility routines for computer graphics, data access, and user interface. Term project required.

571. (CEEEn-MeEn) Engineering Computer Graphics and Software Design. (3)

Prerequisite: FORTRAN, or C, or similar computer language background.

Application of modern computer graphics techniques to engineering problems: 2-D and 3-D transformations, perspective, hidden surface removal, lighting, and shading. Graphics data structures, standards, and device independency. Software design methodology. Term project required.

572. (CEEEn-MeEn) Computer-Aided Geometric Design. (3)

Prerequisite: FORTRAN, or C, or similar computer language background.

Mathematical theory of free-form curves and surfaces and solid geometric modeling. Bezier and B-spline curve and surface theory, parametric and implicit forms, intersection algorithms, topics in computer algebra, free-form deformation. Several programming projects required.

575. (CEEn-MeEn) Optimization Techniques in Engineering. (3)

Prerequisite: Math 321 and FORTRAN, C, or similar computer language background.

Application of computer optimization techniques to constrained engineering design. Theory and use of state-of-the-art computer routines. Robust design methods.

580. Hazardous Waste Management and Control. (3)

Prerequisite: CEEEn 351 or instructor's consent.

Hazardous waste statutes and regulations; introduction to hazardous waste treatment, storage, disposal, and monitoring techniques.

621. Design of Thin Shell Structures. (3)

Prerequisite: CEEEn 424, 504.

Analysis of domes and cylindrical, folded plate, and hypar shells and the design of typical structures of reinforced concrete.

625. Design of Multistory Structures. (3)

Prerequisite: CEEEn 341, 423, 424, 504, or instructor's consent.

Design of shear walls, floors, columns, frames, and foundations, using elastic and plastic methods, including frame response to lateral forces.

641. Advanced Soil Mechanics. (3)

Prerequisite: CEEEn 341 or equivalent.

Advanced discussion and analysis of shear strength of soils, stress distribution in soils, and slope stability analysis.

644. Advanced Foundation Engineering. (3)

Prerequisite: CEEEn 341 or equivalent.

Lateral pressures and earth retaining system, axial and lateral capacities of piles and drilled shafts, foundations subjected to vibratory loadings, foundations on collapsible and expansive soils, soil improvement techniques.

647. Groundwater Flow and Pollutant Transport Modeling. (3)

Prerequisite: CEEEn 341, 431.

Techniques for modeling groundwater flow and pollutant transport in aquifers; seepage analysis of earth dams.

650. Water Treatment Facilities Design. (3)

Prerequisite: CEEEn 351.

Evaluation, selection, and design of water treatment facilities.

651. Wastewater Treatment Facilities Design. (3)

Prerequisite: CEEEn 351.

Evaluation, selection, and design of wastewater treatment facilities.

654. Industrial Waste Treatment. (3)

Prerequisite: CEEEn 650 or 651 (may be concurrent).

Treatment and disposal of industrial wastes; basic industries and their waste problems.

662. Traffic Simulation and Analysis. (3)

Prerequisite: CEEEn 562 or instructor's consent.

Simulating and analyzing highway capacity, traffic flow, and traffic control problems; potential solutions using computer models.

691R. Civil and Environmental Engineering Seminar. (0.5)**694R. Selected Problems in Civil and Environmental Engineering. (1-3)****698R. Master's Project. (1-3)**

Prerequisite: graduate committee's consent.

699R. Master's Thesis. (1-9)

Prerequisite: graduate committee's consent.

794R. Selected Topics in Civil and Environmental Engineering. (1-3)**797R. Research for Doctoral Students. (1-9)****799R. Doctoral Dissertation. (1-9)**

Prerequisite: graduate committee's consent.

FACULTY

BALLING, RICHARD J., *Professor.* PhD, University of California, Berkeley, 1982. Structural Mechanics.

BENZLEY, STEVEN E., *Professor.* PhD, University of California, Davis, 1971. Structural Mechanics.

BORUP, M. BRETT, *Associate Professor.* PhD, Clemson University, 1985. Environmental Engineering.

BUDGE, W. DON, *Professor.* PhD, University of Colorado, 1964. Transportation; Materials.

CHRISTIANSEN, HENRY N., *Professor.* PhD, Stanford University, 1962. Structural Mechanics; Computer Graphics.

GOODWIN, REESE J., *Associate Professor.* PhD, University of Utah, 1976. Structures.

JENSEN, DAVID W., *Associate Professor.* PhD, Massachusetts Institute of Technology, 1986. Structures; Advanced Composites.

JONES, NORMAN L., *Assistant Professor.* PhD, University of Texas, Austin, 1990. Geotechnical Engineering.

MERRITT, LAVERE B., *Professor.* PhD, University of Washington, 1970. Environmental and Water Resources.

MILLER, A. WOODRUFF, *Professor.* PhD, Stanford University, 1975. Hydrology; Hydraulics.

ROLLINS, KYLE M., *Associate Professor.* PhD, University of California, Berkeley, 1987. Geotechnical Engineering.

SEDERBERG, THOMAS W., *Professor.* PhD, Purdue University, 1983. Structural Mechanics; Computer Graphics.

THURGOOD, GLEN S., *Professor.* PhD, Texas A&M University, 1975. Traffic; Transportation.

WALLACE, LYNN P., *Associate Professor.* PhD, West Virginia University, 1970. Water Resources; Environmental Engineering; Surveying.

WILSON, ARNOLD, *Professor.* PhD, Oklahoma State University, 1973. Structures; Concrete.

YOUNG, T. LESLIE, *Professor.* PhD, Iowa State University, 1967. Geotechnical Engineering.

CLOTHING AND TEXTILES

Chair: Charlene Lind

3256 SFLC
PO Box 26796
Provo, UT 84602-6796
(801) 378-7175

THE PROGRAM OF STUDIES

The Department of Clothing and Textiles does not offer a graduate degree but conducts classes for students who have completed the baccalaureate degree and are seeking additional practical experience in the field. These courses are listed below.

COURSE DESCRIPTIONS

520R. Workshop in Clothing and Textiles. (1-3)

Prerequisite: instructor's consent.

545. Period Pattern Making. (3)

Prerequisite: CITx 225, 330, and instructor's consent.

Applying costume history and pattern making to period fashions. Hands-on experience in actual costume construction for theatre productions.

FACULTY

For faculty listings, refer to the BYU Undergraduate Catalog.

COMMUNICATIONS

Chair: David P. Forsyth

Graduate Coordinator: Daniel A. Stout

F-553 HFAC
PO Box 26403
Provo, UT 84602-6403
(801) 378-7551

THE PROGRAM OF STUDIES

The master's program is intended to provide advanced preparation in communication theory and research. The emphasis is on analytical thinking with consideration for both continued academic advancement and professional growth. The program of study includes a core of communication theory and research courses as well as elective courses on a number of communication-related topics.

One degree is offered through the Communications Department: Communications—MA. A minor in communications is also offered.

The department admits 15–20 students each fall to the master's program. The average time of study to complete requirements for the master's degree is 24–30 months.

Communications—MA

The master's program is intended to serve as preparation for:

- Further doctoral studies where theory, teaching, and researching are emphasized.
- Other achievements in a mass communication profession.

Beyond the below-listed courses required by the department, students select—in consultation with advisors—the specific courses that best meet their goals and interests. Generally, students with noncommunications undergraduate majors will be expected to concentrate on communications electives. Those *with* a communications baccalaureate are

encouraged to seek the broadening of electives outside the department.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and May 15 (U.S.).
- Application requirements: the entrance examination is the Miller Analogies Test; minimum required GPA is 3.0 for last 60 semester hours.
- Prerequisite: baccalaureate degree (if undergraduate preparation in communications is not adequate, the department graduate coordinator will require certain courses to satisfy the deficiency); background in research and statistics (prerequisite course required); professional experience in communications is desirable; professional competence in written and spoken English is necessary.

Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours (Comms 699R).
- Required courses: Comms 609, 610, 611, 616 (12 hours), 699R (6 hours); three courses from 604, 605, 613, 614, 615.
- Electives: determined in consultation with advisor and committee.
- Thesis.
- Examinations: (A) written comprehensive examination; (B) final oral examination and defense of thesis.

Communications—Minor

Consult the department chair or graduate coordinator regarding a recommended program of study.

FINANCIAL ASSISTANCE

The principal types of financial aid and awards available to communications graduate students are teaching and research assistantships. TAs oversee undergraduate classes and labs in advertising, broadcasting, journalism, and public relations. Forms are available by writing Bobeta Powell at E-509 HFAC, PO Box 26403, Provo, UT 84602-6403.

RESOURCES AND OPPORTUNITIES

Housed in The Harris Fine Arts Center, the Communications Department contains journalism, advertising, and broadcast laboratories and radio and television studios.

Communications Research Center. Communications graduate students can receive assistance from the director of the Communications Research Center and work with faculty members or receive guidance on their own research in broadcasting, journalism, advertising, and public relations. Computers with SPSS software are available in B-220 HFAC.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

604. Seminar in History of Mass Communication. (3)

In-depth investigation of the various aspects of the history of mass media.

605. Media Criticism/Critical Analysis of Mass Media. (3)

Methods and usefulness of communication criticism; critical approaches to media analysis; relating criticism to communication process components.

606. Management Seminar. (2)

Applications of classical and contemporary management and organizational theories as well as contemporary mass media issues and problems.

607. Seminar in International Communication. (2)

Role of communication internationally and its impact on culture, ethics, morality and politics around the world. Effect of fast-changing communication systems on discourse between governments, peoples, and businesses and organizations.

608. Communication Technology and Policy. (2)

Impacts of communication technologies and policy implications.

609. Proseminar. (2)

Introduction to graduate education, communication theory, and research. Faculty and working professionals present their research programs.

610. Studies in Communication Theory. (3)

Nature and content of contemporary communication theory.

611. Research Methods in Communication. (4)

Prerequisite: meet department statistics requirement (Stat 221 or 552); Comms. 609.

Major methods of research used in communication.

612R. Research Practicum. (1)

Practical experience in research under direction of individual faculty.

613. Literature Seminar. (3)

Literature that contributes to understanding the functioning of communication processes.

614. Communication Ethics. (3)

Pooled efforts identify principles and illuminate selected ethical issues for existing and potential media environments.

615. Public Opinion Seminar. (3)

Concepts of public opinion and their links to interpersonal and societal processes; mass media.

616. Seminar in Mass Media and Society. (3)

Mass media's roles in major social settings, historical development of open-system societies, contemporary ethical dilemmas, effects of new media.

617. Mass Communication and U.S. Government. (2)

Contemporary legal relationship between government and communication; philosophical and historical basis for regulation in light of constitutional guarantees.

618. Environmental Communication. (2)

Mass communication theory and research, process and practice as it relates to public communication campaigns, efforts to affect regulations and policy, and mass media coverage of environmental issues.

619. Mass Communication and Gender. (2)

Gender issues related to the communication process. Implications of recent theoretical developments in the feminist literature for communication studies.

620. The Media and Popular Culture. (2)

Cultural expression as a reflection of spirit of contemporary society. Popular culture as instrumental in furthering ideological foundations of society.

691R. Special Studies in Communications. (1-3)

Individual work on approved problems not leading to a thesis. Projects must be approved before registration.

695R. Topical Seminar. (1-3)

699R. Master's Thesis. (6V)

FACULTY

BARNEY, RALPH D., *Professor.* PhD, University of Missouri, Columbia, 1971. Media Ethics; International Communication; Media and Society.

EGAN, KATHRYN S., *Associate Professor.* PhD, University of Southern California, 1972. Broadcast Women Research.

FORSYTH, DAVID P., *Professor.* PhD, Northwestern University, 1962. Media Research; Magazines.

- GALE, LARRIE ELDON, *Associate Professor*. PhD, University of Utah, 1973. Message Design; International Communication.
- HAINSWORTH, BRAD E., *Professor*. PhD, University of Utah, 1968. Issues Management.
- HUGHES, R. JOHN, *Professor*. International Media and Journalism; Editorials.
- KAGEL, RICHARD I., *Associate Professor*. PhD, Columbia Pacific University, 1980. Advertising Research.
- MARTIN, DENNIS G., *Professor*. PhD, University of Illinois, 1985. Advertising; Cultural Anthropology; History of Advertising.
- NELSON, JACK ADOLPH, *Associate Professor*. PhD, University of Missouri, Columbia, 1971. Magazines; Journalism History.
- PORTER, WILLIAM C., *Associate Professor*. EdD, University of Oklahoma, 1986. New Technologies; Writing Theory.
- PRATTE, PAUL ALFRED, *Professor*. PhD, University of Hawaii, 1976. Journalism History.
- RUSH, J. D., *Associate Professor*. JD, Arizona State University, 1973. Telecommunications and Technology.
- STOUT, DANIEL A., *Assistant Professor*. PhD, Rutgers University, 1993. Media and Religion; Social Impacts of Mass Media.
- STRAUBHAAR, JOSEPH D., *Professor*. PhD, Tufts University, 1981. International Communications; Political Development.
- VALENTI, JOANN M., *Professor*. PhD, University of Michigan, 1983. Environmental Communications; Public Relations.
- WHITING, GORDON C., *Professor*. PhD, Michigan State University, 1967. Assessment of Media Quality.
- WILSON, LAURIE J., *Associate Professor*. PhD, American University, 1988. International Communications; Public Relations.

COMPUTER SCIENCE

Chair: Dan R. Olsen
Associate Chair: William E. Barrett
Graduate Coordinator: Tony Martinez

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THE PROGRAM OF STUDIES

The Department of Computer Science offers two degrees: Computer Science—MS and Computer Science—PhD. On the average, the MS program in computer science has from eighty to ninety students, and the PhD program has from fifteen to twenty.

The MS degree is designed to prepare students either to be technically capable of leading development teams in industrial software development or to be ready to continue on for a PhD. The PhD degree prepares students to be researchers and teachers either in industry or academia. Areas of particular emphasis are listed below under Resources and Opportunities and as research interests in the list of faculty.

The expected duration of the MS program for full-time students who enter without deficiencies is one and a half years. Depending on the number of deficiencies, some students may require additional semesters. Students may not enter the PhD program with deficiencies. For full-time students in the PhD program, the expected duration is three years for those entering the program with an MS in computer science and from four to four and a half years for those entering without an MS in computer science. These expectations assume that students take a full graduate load and begin and complete the steps in their thesis or dissertation research in a timely manner.

Computer Science—MS

Mission Statement. Students should be exposed to and participate in leading-edge research. Depending on their long-range objectives, students should also do one or more of the following:

- Evolve research ideas and produce research results.
- Learn about group development and be technically capable of leading a development team.
- Demonstrate ability to develop software for industrial-size problems.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 20 (U.S. and international); winter, May 15 (U.S. and international); spring, September 15 (U.S. and international).
- Entrance examinations: GRE general test, and the TOEFL examination for those whose native language is not English.
- Prerequisite: baccalaureate degree in computer science or equivalent course work in related undergraduate programs. A student without an acceptable undergraduate degree in computer science may be admitted provisionally into the MS program.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (CS 699R).
- Required courses: determined in consultation with graduate committee.
- Thesis: departmental acceptance of thesis proposal before beginning thesis research.
- Examinations: final oral examination and defense of thesis.

Computer Science—PhD

Mission Statement. Students should be able to:

- Generate new ideas.
- Convince others that their ideas are worth pursuing.
- Do the necessary research to demonstrate that their ideas are viable.
- Communicate the results of their research in the public domain.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 20 (U.S. and international); winter, May 15 (U.S. and international).
- Entrance examinations: GRE general test and GRE subject test in computer science. TOEFL examination is required for those whose native language is not English.
- Prerequisite: baccalaureate degree in computer science or equivalent (students with undergraduate deficiencies should enroll in the MS program).

Requirements for Degree.

- Credit hours (66): minimum 48 course work hours plus 18 hours of dissertation research. Must include CS 510, 512, and 561.
- Dissertation.
- Examinations: (A) qualifying examinations, a series of examinations demonstrating broad proficiency in computer science, must be taken no later than one year from the student's admittance to the program; (B) preliminary examination, demonstrating preparedness to fulfill dissertation research; (C) oral defense of dissertation.
- Residency: a student must spend at least the last three consecutive semesters as a full-time resident (combined spring and summer terms count as one semester).
- Teaching: all students must teach at least one course.

FINANCIAL ASSISTANCE

The Computer Science Department recognizes that most students require financial assistance to remain in school. The department has funds to supplement students' financial needs in the following forms: internships, teaching and research assistantships; and tuition awards.

RESOURCES AND OPPORTUNITIES

Artificial Intelligence and Expert System Laboratories. Investigations of artificial intelligence techniques are conducted for the automating of

problem-solving processes that are informal, heuristic, and symbolic in nature. Research currently includes implementation issues, knowledge representation, prototypes and their validation, fuzzy logic, measures of belief, certainty theory, Bayesian probability theory, and logical inferencing.

Computer-Aided Education State Center of Excellence. The computer-aided education group is interdisciplinary but is based in the computer science department's instruction program. The group works toward developing improved software for computer-based instruction, especially productivity tools for the creation and delivery of courseware and the application of artificial intelligence techniques to the creation of adaptive teaching systems.

Computer Graphics Laboratories. Graphics research in the department concentrates on photo realistic rendering, animation vector field tools for graphics, the representation of hyper-dimensional objects, and the automatic generation of interactive software for graphical presentations.

Computer Vision Laboratory. Research in computer vision deals with the recognition and description of two-, three-, and four-dimensional patterns from two-dimensional images. Current research includes boundary tracking and region growing for image segmentation, interactive techniques, document compression and understanding, medical imaging, content-based image queries, and automated generation of virtual environments.

Interactive Software Systems Laboratory. The tools this laboratory produces can automatically generate user-interface software, thereby reducing the cost of developing user-friendly applications. The laboratory also develops techniques to measure the effectiveness of user-interface software.

Laboratory for Applied Logic. This laboratory supports research into com-

puter dependability. Mathematical analysis of computer software and hardware is not an easy task; every formal analysis done to date has been a virtuoso performance, carried out by experts in logic, specification, and mechanical reasoning. The goal of LAL researchers is to make the formal modeling and analysis of computer systems tractable for working software and hardware design engineers.

Networked Computing Laboratory. High-speed computer networks are having an effect on almost every aspect of our lives. In this laboratory we explore asynchronous transfer mode (ATM) networks, which will be used as the building block for the National Information Infrastructure (NII). Research is currently being performed on virtual LANs (VLANs), parallel virtual machine (PVM) programming and performance analysis, Motion Picture Experts Group (MREG) encoding over ATM networks, and ATM network topologies for parallel processing.

Neural Networks and Machine Learning Laboratory. The goals of the NNML laboratory include the proposal, extension, and demonstration of improved learning models with respect to generalization accuracy, speed of learning, and fault tolerance. We seek models that combine the best aspects of neural network approaches with symbolic artificial intelligence machine learning paradigms.

Object-Oriented Systems Modeling Laboratory. The mission of this laboratory is to develop theoretical foundations, professional engineering methods, and tools for creating object-oriented software and database systems. Researchers in the laboratory study software development activities including analysis, design, specification, implementation, and enhancement in terms of the principles of software engineering and database systems. The objective is to make the development of software and database systems a true engineering discipline.

Operating Systems Laboratories. The computer science department has advanced course work and laboratory facilities to support research in real time process control and in concurrent and distributed processing. Studies are under way on the creation of programming languages and operating systems that will enhance the use of concurrent processes in a distributed environment.

Performance Evaluation Laboratory. The performance evaluation research group develops novel hardware and software techniques to measure the performance of existing computer systems. PEL researchers use the acquired performance data to improve computer architectures, memory hierarchies, I/O systems, operating systems, compilers, and applications.

For a more detailed description of the graduate program requirements, use WWW:

*[http://
www.cs.byu.edu/
grad-info/cs-grad-hb.html](http://www.cs.byu.edu/grad-info/cs-grad-hb.html)*

COURSE DESCRIPTIONS

501R. Special Topics in Computer Science. (1-3)

Prerequisite: instructor's consent.

Special subjects as announced before each semester.

510. Formal Languages and Syntactic Analysis. (3)

Prerequisite: CS 431 or instructor's consent.

Definition of formal grammars and algorithms for syntactic analysis.

512. Analysis of Algorithms. (3)

Prerequisite: CS 312 and CS 252, or instructor's consent.

Survey of important algorithms. Connections to theoretical computer science and analysis of algorithms.

521. Pattern Recognition. (3)

Prerequisite: calculus and senior or graduate standing or instructor's consent. Recommended: linear algebra

Design and use of pattern classifiers for recognition and classification of one- and two-dimensional signals such as voice, images, and handwriting. Emphasis on images.

525. Software Creation. (3)

Prerequisite: CS 428.

Concepts of object-oriented software development and their incorporation into various object-oriented analysis and design techniques.

531. Compiler Theory and Design. (3)

Prerequisite: CS 431.

Theory and design of compilers and interpreters, including syntax-directed compilers and metacompilers.

532. Advanced Programming Languages and Models. (3)

Prerequisite: CS 431.

Definitions and implementation techniques for functional languages, logic languages, and object-oriented languages. Interactive languages and interactive programming environments.

535. (CS-Psych 577) Human-Computer Interaction. (3)

Prerequisite: graduate or senior standing.

Human/machine interfaces for hardware/software integration. Psychological principles of computer interfacing. Human engineering, ergonomics, and software design principles for user-friendly applications.

544. Advanced Operating Systems. (3)

Prerequisite: CS 345.

Advanced operating system concepts and design techniques, including concurrency, distributed systems, networking, synchronization, multitasking, etc.

545. Process Control Systems. (3)

Prerequisite: CS 245 or 345 or equivalent.

Concurrent and distributed real-time operating systems and programming environments for industrial automation.

550. Computer Vision 1. (3)

Prerequisite: calculus and senior or graduate standing or instructor's consent. Recommended: linear algebra.

Machine vision, image segmentation, mathematical morphology, image enhancement and filtering, edge detection, feature extraction, neighborhood operators, region growing, boundary detection, scene segmentation, and matching.

551. Relational Database Theory. (3)

Prerequisite: CS 452 or instructor's consent.

Relational algebra and calculus, dependency and normalization theory.

552. Object-Oriented Database Systems. (3)

Prerequisite: CS 452 or instructor's consent.

Analysis, specification, design, and implementation of object-oriented database systems; theory of object-oriented database models and systems.

554. Distributed Databases. (3)

Prerequisite: CS 236 or equivalent.

Distributed DBMS design, architecture, query processing and optimization, data allocation, transaction management, concurrency control, recovery, integrity and security, deadlock handling.

555. Advanced Computer Graphics. (3)

Prerequisite: CS 455 or instructor's consent.

Advanced computer graphics systems programming and architecture, including ray tracing, radiosity, animator, and physically based modeling.

556. Interactive Software Systems. (3)
Prerequisite: CS 330, 455.

Techniques to implement human/computer interfaces. Primitive interactive techniques. Grammar, automata, procedure, object-based dialogue descriptions. Tools for automatically generating and evaluating user interfaces. Screen layout; data presentation tools.

560. Computer Networks. (3)
Prerequisite: CS 460, Stat 321.

Computer networking, software architecture, organization, protocols, routing, global networks, local networks, internetworking, standards, and applications.

561. Theoretical Foundations of Computer Science. (3)
Prerequisite: CS 252 or instructor's consent.

Formal languages, automata theory, sequential machines, enumerability, computability, and undecidability.

565. Data Security. (3)
Prerequisite: CS 404. Recommended: CS 453, 560.

Data security problems and solutions. Protection of stored or transported data. Data security principles. Hardware and software systems; mathematical, technical, and legal considerations.

572. Machine Learning. (3)
Prerequisite: Math 119 and graduate or senior standing.

Algorithms approaches and philosophy of machine learning with emphasis on symbolic/AI approaches.

575. Expert Systems Design. (3)
Prerequisite: CS 470 or instructor's consent.

Knowledge-based systems, fundamentals of knowledge engineering, rule-based systems, tools for expert system development.

576. Intelligent Tutoring. (3)
Prerequisite: CS 575 or instructor's consent.

Taxonomy of knowledge-based computer-assisted instruction; design and evaluation of intelligent tutoring models.

578. Neural Networks and Connectionist Computing. (3)
Prerequisite: CS 380, Math 119, and senior or graduate standing.

Neurally inspired computer architectures and methods of computation and learning using massively parallel networks.

580. High Performance Computer Architecture. (3)
Prerequisite: CS 380 or equivalent.

Advanced topics in computer architecture, including pipelining, super-pipelining, VLIW, superscalar, branch prediction, and speculative execution.

584. Parallel Processing. (3)
Prerequisite: CS 380 or equivalent.

Theoretical and practical study of parallel processing including a discussion of parallel architectures, parallel programming languages, and parallel algorithms.

586. Formal Methods in Computer System Design. (3)
Prerequisite: CS 153, 380, or equivalent.

Use of specification and verification in the design of computer systems. Introduction to mechanical theorem proving environments.

598R. Special Projects. (1-3)
Prerequisite: instructor's consent.

627. Theoretical Foundations of Software Engineering. (3)
Prerequisite: CS 525.

Introduction to theory aspects of computer science that pertain to software engineering (proof of correctness, conceptual models).

650. Computer Vision 2. (3)
Prerequisite: CS 550.

Advanced topics in computer vision: radiometric model; photometric stereo; shape from shading; monocular, binocular models; perspective projective geometry; image matching; depth from stereo; exterior, relative, interior, absolute orientation; optical flow.

678R. Topics in Neural Networks. (3)
Prerequisite: CS 578.

Advanced research topics in areas of non-von Neumann computing, including neural, connectionist, and massively parallel systems. Course tailored toward students' research goals.

699R. Master's Thesis. (Arr.)
Prerequisite: committee chair's consent.

751R. Advanced Topics in Database Systems. (3)
Prerequisite: graduate standing and instructor's consent.

799R. Doctoral Dissertation. (1-9)
Prerequisite: committee chair's consent.

FACULTY

BARRETT, WILLIAM A., *Professor.* PhD, University of Utah, 1978.

Computer Vision; Image Processing; Pattern Recognition.

BURTON, ROBERT P., *Professor.* PhD, University of Utah, 1973.

Hyperdimensional Computer Graphics; Visualization.

CAMPBELL, DOUGLAS M., *Professor.* PhD, University of North Carolina, 1971. Complexity Theory.

CHRISTENSEN, LARRY C., *Professor.* EdD, Brigham Young University, 1981. Expert Systems; Intelligent Computer-Assisted Instruction; Software Engineering.

CLEMENT, MARK J., *Assistant Professor.* PhD, Oregon State University, 1994. Parallel Processing; High-Performance Networks; Telecommunications.

CORNELL, AUREL, *Professor.* PhD, Polytechnic Institute of Timisoara (Romania), 1971. Distributed/Concurrent Programming.

- EGBERT, PARRIS K.**, *Assistant Professor*. PhD, University of Illinois, 1992. Computer Graphics; Visualization; Virtual Reality.
- EMBLEY, DAVID W.**, *Professor*. PhD, University of Illinois, 1976. Database Systems; Semantic Modeling; Object-Oriented Software Development.
- FLANAGAN, J. KELLY**, *Assistant Professor*. PhD, Brigham Young University, 1993. Computer Architecture; Performance Evaluation; Digital System Design.
- HAYS, BILL**, *Professor*. PhD, Northwestern University, 1970. Database Systems; Compiler Development; Programming Languages.
- HIGGINS, JOHN C.**, *Professor*. PhD, University of California, Davis, 1966. Theoretical Foundations.
- IVIE, EVAN L.**, *Professor*. PhD, Massachusetts Institute of Technology, 1966. Operating Systems.
- MARTINEZ, TONY**, *Associate Professor*. PhD, University of California, Los Angeles, 1986. Neural Networks; Machine Learning.
- MORSE, BRYAN S.**, *Assistant Professor*. PhD, University of North Carolina, 1994. Computational Vision; Image Processing; Medical Imaging.
- NG, DENNIS**, *Assistant Professor*. PhD, Kansas State University, 1991. Database Systems; Logic Programming; Distributed and Parallel Databases.
- NORMAN, THEODORE A.**, *Professor*. PhD, Washington State University, 1970. Systems Simulation; 3-D Animation; Operating Systems.
- OLSEN, DAN R.**, *Professor*. PhD, University of Pennsylvania, 1981. Human-Computer Interfaces; Programming Environments; Computer Graphics.
- STOKES, GORDON E.**, *Professor*. EdD, Brigham Young University, 1981. Database Management; Human Factors; Intelligent CBI Systems.
- WHITEHURST, R. ALAN**, *Assistant Professor*. PhD, University of Illinois, 1995. Reusability; Analogy; Knowledge-Based Software Engineering; Modeling; Simulation.

- WINDLEY, PHILLIP J.**, *Assistant Professor*. PhD, University of California, Davis, 1990. Formal Methods; Hardware Verification; Software Specification.
- WOODFIELD, SCOTT N.**, *Professor*. PhD, Purdue University, 1980. Software Design; Reusability; Software Engineering.

DANCE

Chair: Sara Lee Gibb

Graduate Coordinator: Pamela S. Musil

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THE PROGRAM OF STUDIES

The Department of Dance defines dance in three dimensions—the physical, the intellectual, and the spiritual. Dance refines and integrates the body, mind, and spirit in a continual pursuit of excellence.

The Dance Department of Brigham Young University is committed to preparing reflective, articulate dance artists, teachers, and scholars. The dance program honors and preserves the past, gives voice to the present, and seeks to define the future as it provides for study, research, experimentation, practice, and the creation and performance of new works. This in turn extends our commitment to the enrichment and benefit of all who choose to participate while maintaining the strictest of academic, moral, and performance standards. This is accomplished through a rich and diversified body of course work, a full schedule of on-campus concerts, and an extensive touring program.

The Dance Department comprises four divisions: Ballet, Ballroom Dance, Folk Dance, and Modern Dance. In addition, several levels of classes are taught in jazz, tap, precision, and aerobic dance. The department also provides classes and choreographic and collaborative work with the Department of Music and the Department of Theatre and Film.

The Department of Dance has the following academic thrusts: (1) developing greater understanding of new ideas and creative works through careful research, rigorous intellectual inquiry, and masterful artistic effort;

(2) recognizing and understanding our cultural and intellectual heritage; and (3) carefully preparing well-qualified professionals who not only do but also contemplate, comprehend, and articulately express what has been found.

The direction of the Department of Dance is to intensify learning experiences in all selected areas of emphasis within the dance discipline by providing demanding course work; enhanced creative, pedagogical, and research opportunities; and real-life experiences.

Each year the Department of Dance admits an average of twenty to twenty-five students. The program is designed to be completed in three or four semesters.

One degree is offered through the Department of Dance: Dance—MA.

Dance—MA

This graduate program provides equal focus in three areas of emphasis: (1) Choreography/Performance, with a thesis; (2) Pedagogy/Research, with a thesis; and (3) Pedagogy/Research, requiring course work only.

Areas of emphasis from within a large, diverse program are determined by elective choices beyond the required core of dance studies.

Admission and Entry.

- Semesters of entry and application deadlines: fall and summer, February 1. By the posted deadline, all parts of the completed application must have been received by the Dance Department Graduate Office. To be complete the application must include all items requested in the application packet provided by the department. **Note:** Candidates may enter either fall or summer. The fall entry program is designed to be completed in three or four semesters. The "summer only" program is designed to be completed in four summers. Entry into the summer program is offered only in odd-numbered years.

- Application requirement: GPA must be a minimum 3.0 for last 60 hours of undergraduate work.
- Entrance examination: GRE general test. Application will not be considered without GRE scores. Please allow 4–6 weeks after the test date for scores to be received by the Office of Graduate Studies.
- Prerequisite: baccalaureate degree in dance with knowledge and competency equivalent to that required in the undergraduate program at Brigham Young University; applicants will be required to satisfy deficiencies.
- Audition: All applicants except current BYU undergraduate dance majors must audition in person or submit a videotape (or other suitable documentation) demonstrating basic dance competency and proficiency in one or more of the following areas: choreography, performance, pedagogy, research. Audition must be completed **before** admission deadline of February 1. Contact the Dance Department for calendared date.

Requirements for Degree—Choreography/Performance Emphasis

- Credit hours (30): minimum 24 course work hours plus 6 project or thesis hours (Dance 699R).
- Required courses (15 hours): Dance 540R or 630R (4 hours), 601 (1 hour), 610 (3 hours), courses selected from 640 through 653 (3 hours), courses selected from 660 through 663 (4 hours).
- Dance electives (5 hours): selected from Dance 500R, 540R, 555, 562R, 563R, 599R, 630R, 638R, courses not previously selected from 640 through 653, courses not previously selected from 660 through 663, 695R, 697R.
- Electives (4 hours): selected from graduate courses in any college. For example, anthropology, art, dance, humanities, music, physical education, theatre, or other graduate programs as determined in consultation with graduate committee.
- Completion of at least one advanced ballet or modern technique class

during each semester of enrollment (may or may not be part of required or elective courses).

- Successful periodic reviews of progress.
- Formal presentation and documentation of student choreography and/or performance.
- Thesis: includes written and oral presentation of three-chapter thesis prospectus.
- Examinations: (A) comprehensive oral examination on course work; (B) oral defense of thesis.

Requirements for Degree—Pedagogy/Research Emphasis.

Project/Thesis Option:

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Dance 699R).
- Required courses (15 hours): Dance 540R or 630R (4 hours), 601 (1 hour), 610 (3 hours), courses selected from 640 through 653 (3 hours), courses selected from 660 through 663 (4 hours). (Pedagogy emphasis must take 651.)
- Dance electives (5 hours): selected from Dance 500R, 540R, 555, 562R, 563R, 599R, 630R, 638R, courses not previously selected from 640 through 653, courses not previously selected from 660 through 663, 695R, 697R.
- Electives (4 hours): selected from graduate courses in any college. For example, anthropology, art, dance, humanities, music, physical education, theatre, or other graduate programs as determined in consultation with graduate committee.
- Successful periodic reviews of progress.
- Formal written thesis.
- Thesis: includes written and oral presentation of three-chapter thesis.
- Examinations: (A) comprehensive oral examination on course work; (B) oral defense of thesis.

Course Work Option:

- Credit hours: a minimum 36 course work hours.
- Required courses (15 hours): Dance 540R or 630R (4 hours), 601 (1 hour), 610 (3 hours), courses selected from 640 through 653 (3 hours), courses

selected from 660 through 663 (4 hours). (Pedagogy emphasis must take 651.)

- Dance electives (5 hours): selected from Dance 500R, 540R, 555, 562R, 563R, 599R, 630R, 638R, courses not previously selected from 640 through 653, courses not previously selected from 660 through 663, 695R, 697R.
- Electives (6 hours): selected from graduate courses in any college. For example, anthropology, art, dance, humanities, music, physical education, theatre, or other graduate programs as determined in consultation with graduate committee.
- Support area (10 hours): aggregate of graduate nondance courses forming a supplementary, specialized area of study. The first 10 hours of any minor may be used to satisfy this requirement.
- Successful periodic reviews of progress.
- Examination: comprehensive oral examination on course work.

FINANCIAL ASSISTANCE

Substantial academic scholarships, teaching assistantships (by audition), research internships, choreography/performance internships, and performance and supplemental awards are available for qualified candidates.

RESOURCES AND OPPORTUNITIES

The Department of Dance is housed in the Richards Building, whose facilities are among the best in the nation. Faculty and dancers have access to eleven fully equipped and air-conditioned rehearsal studios, two of which convert into dance production studios. Ballroom dancers also have access to four student center ballroom-teaching facilities. Two full-scale theatres in the Harris Fine Arts Center and an additional 10,000 seats in the Marriott Center are available for major concerts given by the Dance Department's world-famous performing groups, The Dancers' Company, Ballroom Dance Company, DanceEnsemble, International Folk Dance Ensemble, and

Theatre Ballet, as well as visiting guest artists.

Other resources include: the Biomechanics Laboratory and the Learning Resource Center. In the Biomechanics Lab, special cameras and other equipment, including a neuromonic digitizer for quantitative analysis of motion, are available to assist researchers in the analysis of performance in sport and dance from a biomechanical perspective.

The Learning Resource Center contains eighteen individual study areas for graduate students as well as computer, audio, and video equipment to assist them in their work.

Other important resources include:

- *Laser disc/computer technology* for use in a variety of settings for study and further development.
- *Dance conditioning laboratory* for use with major body therapies, particularly conditioning with the use of Pilates-based equipment.
- *Media Services*, accessible by graduate students for teacher assistant instruction and course purposes. (A fee may be assessed for personal use.)
- A *sound room* for recording and editing.
- *Library support* for graduate work in dance, with access to over 30 million title records through interlibrary loan with membership in RLIN. Printed and CD-ROM versions of the Dictionary Catalogue of the New York Public Library Dance Collection is available.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500R. Workshop in Dance. (1-3)

Experience with Workshop in Dance: aerobic, ballet, ballroom, folk, modern.

540R. Modern Dance Technique and Theory 5. (2)

Prerequisite: Dance 340R or equivalent.

Advanced technique, with movement combinations emphasizing dance as a performance art.

555. Dance Production. (2)

Prerequisite: Dance 355 or equivalent.

Technical and design aspects of dance production.

562R. Modern Dance Composition, Advanced. (1)

Prerequisite: Dance 362 or instructor's consent.

Development of substantive modern dance compositional works based on intent, form, and content relationships.

563R. Modern Dance Improvisation, Advanced. (1)

Prerequisite: Dance 363 or instructor's consent.

599R. Cooperative Education: Dance Practicum. (1-6)

Field experience for teaching and performance in dance.

601. Introduction to Graduate Studies in Dance. (1)

Prerequisite: admission to graduate program.

Orientation to program requirements, evaluation of student aptitude for graduate studies, and introduction to bibliographic skills in dance research.

610. Research Methods in Dance. (3)

Designing, analyzing, and reporting on dance research. Topic selection, applicable dance research methods, interpreting, and critiquing dance research. Preparation of MA thesis prospectus.

630R. Dance Technique, Advanced. (1-2)

Prerequisite: instructor's consent.

Course designed for higher-level assignment and credit while attending ballet, ballroom, folk, or modern advanced technique course.

638R. Dance Performance. (1-2)

Prerequisite: instructor's consent.

Performing with a BYU dance company.

640. Creativity. (1)

Relationship of creativity to the discipline of dance.

641. Cultural Aspects of Dance. (1)

Cultural influences upon dance.

642. Current Trends in Dance. (1)**643. Dance Aesthetics. (1)**

Aesthetic principles and concepts as they relate specifically to dance as an art form.

650. Dance Criticism. (2)

Introduction to writings of major dance critics, issues in reviewing performances, and practice in writing reviews.

651. Dance Pedagogy. (2)

Prerequisite: undergraduate course in dance methodology or equivalent.

Nature and application of pedagogy from universal and dance perspectives.

652. Exploration of Dance Therapies. (2)

Study of concepts of and approaches in dance therapy and body therapies.

653. Movement Analysis Systems. (2)

Comparison of various systems of analyzing and recording movement. Emphasis on methods of objectifying movement to facilitate qualitative interpretation.

660. Dance Composition—Theory and Principles. (2)

Scholarly research in dance composition.

661. Dance Improvisation—Theory and Principles. (2)

Prerequisite: Dance 451 or equivalent.
Research in dance improvisation.

662. Dance Performance—Theory and Principles. (2)

Research in dance performance.

663. Dance Technique—Theory and Principles. (2)

Research in dance technique.

695R. Dance and Related Fine Arts. (1–4)

Interdisciplinary study integrating dance with art, literature, music, or theatre.

697R. Individual Research and Composition in Dance. (1–4)

Prerequisite: admission to graduate study in dance.

Pedagogical research, choreographic, or performance project (faculty approved and supervised). Presentation of resultant product required.

699R. Master's Thesis. (1–6)**FACULTY**

ALLEN, SANDRA BIRCH, *Associate*

Professor. MFA, University of Utah, 1967. Ballet; Methodology; Technique; History.

BLACK, CATHERINE H., *Associate*

Professor. MFA, University of Utah, 1972. Dance History; Modern Dance; Choreography; Performance; Research Methods.

DEBENHAM, HADD PATRICK, *Associate*

Professor. MA, University of California, Los Angeles, 1976. Modern Dance; Choreography; Technique; Performance; Musical Dance Theatre, Laban Movement Analysis; Bartenieff Fundamentals.

GIBB, SARA LEE, *Professor. MS,*

Brigham Young University, 1970. Modern Dance; Dance Education; Pedagogy; Dance and Body Therapies.

MUSIL, PAMELA S., *Assistant Professor.*

MA, Brigham Young University, 1985. Modern Dance; Dance Education; Kinesiology; Technique; Movement Analysis.

PHILLIPS, REBECCA WRIGHT, *Assistant*

Professor. MFA, University of Utah, 1990. Modern Dance; Music Dance Theatre; Technique; Choreography; Performance.

PROHOSKY, CAROLINE, *Associate*

Professor. MA, University of California, Los Angeles, 1980. Modern Dance; Choreography; Technique; Performance.

SOWELL, DEBRA, *Adjunct Assistant*

Professor. PhD, New York University, 1990. Dance Criticism, History, Research Methods.

ECONOMICS

Chair: Farrell E. Jensen

130 FOB

PO Box 22363

Provo, UT 84602-2363

(801) 378-2859

THE PROGRAM OF STUDIES

The Department of Economics does not offer a graduate degree but offers the following graduate courses:

COURSE DESCRIPTIONS**580. Advanced Price Theory. (3)**

Prerequisite: Econ 378, 380, 382, or equivalent.

Individual behavior and markets.

581. Advanced Macroeconomics. (3)

Prerequisite: Econ 378, 380, 381, 382.

Income, unemployment, and price-level analysis.

582. Welfare Economics. (3)

Prerequisite: Econ 378, 380, 382.

General equilibrium theorems and considerations that must guide applied economic work and provide quantitative information on effects of alternative policy measures.

586. Mathematical Economics. (3)

Prerequisite: Econ 378, 380, 381, 382, or equivalent.

Mathematical modeling of economic behavior.

588. Econometrics. (3)

Prerequisite: Econ 378, 380, 381, 382, 388.

Theory and practice of economic measurement.

FACULTY

For faculty listings, refer to the BYU Undergraduate Catalog.

EDUCATIONAL LEADERSHIP

Chair: Ivan D. Muse

310 MCKB
PO Box 25092
Provo, UT 84602-5092
(801) 378-4291

THE PROGRAM OF STUDIES

Statement of Purpose. "The primary task of good leaders is to release human potential."

That significant task cannot be accomplished solely via "doing" or "acting," because mere performance can be calculated and trivialized. Deeper than our observable behavior is our "being," our essential self. We believe good leadership is a matter of *becoming someone*, as well as *doing something*.

Insofar as programs of the department provide for both the "becoming" as well as the more typical "doing," graduates acquire the potential to make a genuine difference in the profession of education. By being more than simply technically competent, graduates of the department can affect positively the thoughts, actions, and relationships not only of school personnel, but of other colleagues as well, in corporate, community, governmental, and ecclesiastical settings.

The Department of Educational Leadership assists students in developing individualized study plans. Emphasis may be developed in areas such as administration, curriculum, teaching and learning, higher education, finance, law, policy development, research, educational philosophy, human resources development, or organizational behavior.

The Department of Educational Leadership offers three degrees: Educational Leadership—MEd, Educational Leadership—EdD, and Educational Leadership—PhD.

Administrative/Supervisory Certification. Graduate programs in the department are designed to prepare educators with the necessary knowledge and skills for educational leadership. Students may either pursue study that leads to a Utah Supervisory/Administrative Certificate or take specified courses leading to an endorsement in teaching gifted and talented students. Sixteen hours of course work and field practice are required.

Students are admitted for graduate study on a part- or full-time basis. Admission to the PhD program requires at least one year of full-time registration. Doctoral students are admitted one time a year based upon a screening procedure held each February.

Consult the department for details.

Educational Leadership—MEd

Within the educational leadership major, students receive guidance from an academic graduate committee in developing their own professional focus and drawing upon their interests, expertise, and professional goals. This personal professional focus guides the study of the student beyond the requirements of the departmental core.

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, summer, March 15.
- Application requirements: minimum required 3.0 GPA for last 60 hours.
- Entrance examinations: GRE general test, GMAT, LSAT, or Miller Analogies Test. For international applicants, TOEFL.
- Prerequisite: baccalaureate degree; for curriculum and instruction or school administration emphasis, minimum one year's professional experience.

Requirements for Degree.

- Credit hours: 36.
- Required courses: consult outline available in department office.

- Study list: should be submitted by end of first semester.
- Credit limitations: ELdr 515R or extension credit will not be counted toward a degree program.
- Examinations: Final written and/or oral comprehensive examination covering course work.

Minimum Registration. Following admission to the MEd program, students will be expected to work continuously toward completion of all requirements for the degree. The university requires that students complete at least 6 semester hours of approved program credit during each academic year (September 1 to August 31). Students are permitted five years to complete the degree and graduate.

Educational Leadership—EdD

The doctor of education program provides graduate students with scholarly learning experiences that will enable them to become superb educational leaders. To accomplish this purpose, the department admits graduate students who have the potential to become leaders with vision and wisdom, and who can influence the educational enterprise.

The EdD has three elements: first, *core courses* presumed to expand the knowledge base required for good leadership in contemporary educational settings; second, a *comprehensive examination* that allows the student to demonstrate the ability to integrate and synthesize ideas learned from various courses; third, a *dissertation*, which, in general, emphasizes the application of theoretical constructs to educational policies and practices.

Admission and Entry.

- Semesters of entry and application deadlines: all application materials must be completed and on file in the Office of Graduate Studies by January 15 of each year to be considered for admission to graduate study the coming summer or school year semesters. Screening and selection of students to be admitted occurs

- one time only, during February. Interested students are notified in advance of the date of screening.
- Entrance examinations: the GRE general test, GMAT, LSAT, or Miller Analogies Test; and for international applicants, TOEFL. The department may require additional examinations.
 - Prerequisite: master's degree; a minimum three years' professional experience in a leadership position related to education. A graduate-level statistics course may be accepted if taken as part of the master's degree.

Requirements for Degree.

- Credit hours (90): minimum 78 course work hours plus 12 hours of dissertation (ELdr 799R); minimum 45 hours taken in the BYU doctoral program. Credit earned in a recognized advanced degree program such as a master's or educational specialist may apply.
- Required courses: see program outline available in department office.
- Study list: should be submitted by the end of the first semester.
- Credit limitations: ELdr 515R or extension credit will not be counted toward a degree program.
- Minor (optional): 18 hours in a department outside the College of Education.
- Residence:
Full-Time Doctoral Students: two consecutive registrations (at least 6 hours each) on the BYU Provo campus. **Note:** Only 3 hours of dissertation credit may apply toward residency.
- Dissertation: must be a rigorous, independent, guided research project involving the identification and solution of a significant problem in educational leadership. The EdD dissertation carries 12 credit hours and may not be undertaken until successful completion of the comprehensive examination and approval of the dissertation prospectus by the graduate committee and the department chair. The dissertation and prospectus defense are different in kind from course work per se; therefore, performance on these tasks may not correlate

with performance in individual courses.

- Examinations: (A) written and oral comprehensive examinations; (B) oral defense of dissertation.

Minimum Registration. Following admission to the doctoral program, students will be expected to work continuously toward completion of all requirements for the degree. The university requires that students complete at least 6 hours of approved program credit during each academic year (September 1 to August 31). Students are permitted eight years in which to complete the degree and graduate.

Educational Leadership—PhD

This degree program prepares students for school leadership, scholarly inquiry, and teaching and research in the education process. Applicants should have a high interest and aptitude for research and inquiry and commit themselves to a minimum one year of full-time study on campus. It is expected that a portion of the individual student's study time will involve collaborative research and inquiry with selected faculty members.

Admission and Entry.

- Semesters of entry and application deadlines: all application materials must be completed and on file in the Office of Graduate Studies by January 15 of each year to be considered for admission to graduate study the coming summer or school year semesters. Screening and selection of students to be admitted occurs one time only, during February. Interested students are notified in advance of the date of screening.
- Application requirements: the accepted entrance examinations are: the GRE general test, GMAT, LSAT, or Miller Analogies Test; and for international applicants, TOEFL. The department may require additional examinations.
- Prerequisite:
Educational-Leadership-Emphasizing-Administration Candidates: minimum three years' professional experience

in leadership and/or administration consistent with the major area of study

Educational-Leadership-Emphasizing-Curriculum-and-Instruction Candidates: minimum three years' professional experience consistent with the major area of study.

Requirements for Degree.

- Credit hours (96): minimum 78 hours beyond the baccalaureate degree plus 18 hours of dissertation credit (ELdr 799R). Prior credit earned in a recognized advanced degree program may apply on the recommendation of graduate committee.
- Required courses: consult department for major core courses.
- Study list: should be submitted by the end of the first semester.
- Credit limitations: ELdr 515R or extension courses are not accepted toward degree programs.
- Minor: 18 hours in a department outside the College of Education.
- Residence: two consecutive full-time semesters (9 hours each semester) on the BYU Provo campus.
- Skill requirement: consult department.
- Dissertation: A dissertation is required. The purpose of the PhD is to expand, in creative ways, the theoretical knowledge base of the educational leadership field. The dissertation should reflect such emphasis. The dissertation carries 18 credit hours and presumes advanced research expertise. It may not be undertaken until successful completion of the comprehensive examination and approval of the dissertation prospectus by the student's graduate committee and department chair.
- Examinations: (A) written examination; (B) oral defense of dissertation.

Minimum Registration. Following admission to the doctoral program, students will be expected to work continuously toward completion of all requirements for the degree. The university requires that students complete at least 6 hours of approved program credit during each academic year

(September 1 to August 31). The student has eight years to complete the degree.

FINANCIAL ASSISTANCE

Research Assistantships. A limited number of research assistantships are available for full-time students. These assignments involve working with selected faculty members on a ten- to twenty-hour-per-week basis. Assistantships are given for a one-year period only but may be extended following review of student performance.

Tuition Waivers. Waivers are available on a limited basis. Students receiving assistantships are not normally given tuition waivers. Tuition aid is given on the basis of need, and applications should be received in the department by May of each year for consideration for the following summer term and academic school year.

Scholarships. Several modest scholarships are also available. Contact the department for application forms and additional information about these opportunities.

RESOURCES AND OPPORTUNITIES

Computer Laboratory with Access to VAX. Computer terminals in the laboratory provide graduate students direct line access to the university's large mainframe computers, enabling students to use several sophisticated programs, such as SPSS and SAS, to analyze research data. These terminals also enable students to search out books in the Harold B. Lee Library.

Educational Psychology Center. This center affords students an opportunity to learn and practice a variety of applications for the principles and theories they study in their course work. Through practical applications students gain valuable experience in diagnosing learning and achievement difficulties; remedying learning and behavioral problems; consulting with parents, teachers, and other profes-

sionals regarding strategies for helping the center's clients; counseling individuals with academic, vocational, or personal problems; and giving career assessment and guidance to young people and adults.

Graduate Student Project and Research Laboratory. Laboratory space is provided for graduate students who are working with faculty on research, evaluation, and development projects.

Study Areas. Graduate study areas are available in the Project and Research Laboratory, the Science Education Laboratory, and the College of Education Learning Resource Center.

Faculty research interests currently include: international education; evaluation of school principal performance; rural education; school district administrative personnel policies; university programs for developing public school leaders.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

Note: ELdr 515R is for teacher certification purposes only and is listed in the BYU Undergraduate Catalog.

517. Professional and Scholarly Writing in Education. (2)

Refining skills for professional writing efforts, e.g., memoranda, reports, articles, theses, etc. Practice and corrective feedback.

532. Gifted and Talented: Programs. (2)

Varied programs for gifted and talented students in the schools.

535. Gifted and Talented: Curriculum and Instruction. (2)

Designing curriculum and instruction for gifted and talented students in the schools.

537. Gifted and Talented: Creativity. (2)

Nature of creativity and approaches to nurturing it.

539R. Gifted and Talented: Practicum. (1-4)

Experience in a school setting under the direction of college faculty.

600. Stewardship: The Human and Organizational Domains. (2)

Leadership behavior in educational institutions.

602. Stewardship: Educational Reform and the Schools. (2)

Change processes in educational institutions.

609. The School Principal. (2)

Prerequisite: concurrent registration in ELdr 611.

Work of the principal in public schools: instructional leadership, personnel relationships, and administration.

611. Improvement of School Practice. (1)

Prerequisite: concurrent registration in ELdr 609.

The administrative work of the principal.

614. Education of Diverse Populations. (2)

Problems, issues, and programs related to students with varying abilities, interests, and needs.

620. Educational Finance. (2)

Theory, principles, and general practices of public school finances; equalization and finance problems.

622. The Law and Education. (2)

Evolution of American law and its application to American educational systems. Fundamental sources and principles of the law, the judicial structure, and key court cases affecting education in state and federal questions.

628. Curriculum Development and Supervision of Instruction. (2)

Prerequisite: concurrent registration in ELdr 629.

Principles and procedures in curriculum development; role of the supervisor in improving instruction and staff performance.

629. Curriculum Development and Supervision of Instruction. (1)

Prerequisite: concurrent registration in ELdr 628.

Understanding school curriculum and supervision of instruction.

631. Teaching and Learning: Research and Practice. (2)

Teaching and learning from the perspectives of research, practice, and theory.

632R. Field Practicum. (2–6)

Working with a school administrator as a supervised intern (6 hours required for administrative certificate; 2 hours required for MEd degree).

634R. Doctoral Internship. (1–6)

Prerequisite: ELdr 610, 612, 628.

Field experience in state office and local school districts, community colleges, and other agencies.

655. Social and Cultural Foundations of Education. (2)

Social conditions in American society that have major implications for education and the functioning of the school leader.

658. Political Aspects of Education. (2)

Understanding processes and institutions in building support for education; associated issues.

659. Contemporary Issues in Education. (2)

Educational issues in American schools: elementary through college.

660. Stress Management. (2)

Understanding and coping with stress and distress in leadership. Effectively using time in multiple roles in society.

665. Evaluation and Assessment in Education. (2)

Prerequisite: ELdr 663, 664.

Nature, purpose, and function of the evaluation of educational programs.

668. History and Philosophy of Education. (2)

Educational thought in world cultures; philosophies—humanism, pragmatism, etc.—that influence American education.

670R. Workshops in Educational Leadership. (1–3)

Prerequisite: ELdr 610, 612.

671. Educational Research. (3)

Techniques of research in educational settings.

674. Technology Applications in Education. (2)

Administrative and instructional applications of technology in public schools; evaluating software and commercially available materials.

684. Business Administration in Education. (2)

Administering details of executive business affairs in educational institutions.

687. School Personnel Administration. (2)

Role of the school district in public education: Administrative management, negotiations, and communication systems.

688. Educational Facilities. (2)

School planning, site selection, master planning, writing educational specifications, functions of architects, supervising and accepting buildings, relationships with governmental agencies, passing bond elections.

691R. Doctoral Seminar. (1–3)

Prerequisite: departmental consent.

694R. Independent Study. (1–3)

Prerequisite: departmental consent if more than one registration desired.

Study experience in an area of specialization under direction of a faculty member.

695R. Independent Research. (1–3)

Prerequisite: instructor's consent; departmental consent if more than one registration desired.

Individual research study or project under the direction of a faculty member.

696R. Professional Education Project. (1–3)

Disciplined experience in observing, gathering, interpreting, and reporting data.

700. Educational Leadership. (2)

Theories of leadership in educational settings.

702. Educational Change. (2)

Understanding the principles emerging from research on educational change.

720. The Superintendency and Educational Policy. (2)

Role of the school superintendent in developing school policy.

731. Principles of Curriculum Development. (2)

Prerequisite: ELdr 628 or instructor's consent.

Curriculum planning and design and its implementation in schools.

740. Adult and Continuing Education. (2)

Principles, concepts, procedures, and relationships in administering adult and continuing education.

761. The Community College. (2)

History and philosophy of the American two-year college, including major trends and prospects.

762. The College and University in America. (2)

Historical review of challenges facing higher educational administration in today's colleges and universities.

765. Administration and Governance in Higher Education. (2)

Organization and administration of colleges and universities.

775. Data Analysis. (2)

Principles and practices in statistical analysis.

776. Evaluating Research. (2)

Prerequisite: ELdr 671 or equivalent.

Techniques of critical review in educational research.

780. Social Policy and Economic Aspects of Education. (2)

Prerequisite: ELdr 622 or instructor's consent.

Policy development in the schools and economic considerations for financing education.

782. Constitutional Law and Education. (2)

Prerequisite: ELdr 622 or instructor's consent.

Impact of the Constitution on education in America; cases under constitutional law that have influenced policy and practice in the educational system.

788R. Doctoral Practicum. (2-6)

Design and implementation of on-site research. Development of doctoral prospectus under direction of a faculty member.

790R. Educational Leadership in American Schools. (1-4)

Seminar arrangement for students to interact with professional educators on a variety of topics in education.

795. Research and Reporting Techniques for Doctoral Dissertation. (2)

Research designs for planning and conducting research for the doctoral dissertation using survey, inferential, and experimental methods.

799R. Dissertation. (1-18)

Prerequisite: ELdr 795.

FACULTY

BUTTERFIELD, DENNIE D., *Associate Professor*. EdD, University of California, Los Angeles, 1972. Curriculum; Instruction.

HITE, STEVEN J., *Assistant Professor*. EdD, Harvard University, 1985. Human Development; Research.

MUSE, IVAN D., *Professor*. EdD, University of Utah, 1966. Leadership; Educational Administration; Curriculum; Gifted and Talented.

OVARD, GLEN F., *Professor*. EdD, Stanford University, 1959. School Principalship; Facilities.

RANDALL, E. VANCE, *Assistant Professor*. PhD, Cornell University, 1989. Educational Administration; Philosophy and Public Policy Analysis.

VAN ALFEN, CURTIS N., *Professor*. EdD, University of Utah, 1967. Leadership; Higher Education; Change in Education.

WASDEN, F. DEL, *Professor*. EdD, Brigham Young University, 1971. Law; Leadership.

WEBB, CLARK D., *Associate Professor*. PhD, University of Texas, Austin, 1970. Instruction; Writing; Leadership.

EDUCATIONAL PSYCHOLOGY

Chair: Ronald D. Bingham

Graduate Coordinator: Darwin F. Gale

328 MCKB
PO Box 25093
Provo, UT 84602-5093
(801) 378-3859

THE PROGRAM OF STUDIES

The Department of Educational Psychology prepares educators and professionals who work primarily with individuals or small groups. Several programs are offered in the department, but they all pursue at least two common goals. The first is to help individuals enhance the quality of their lives through meaningful personal, educational, and career development. A second common goal is to assist people in overcoming barriers to learning and to success and happiness in life. These barriers include difficulty in hearing, speaking, communicating, thinking, reading, studying, learning, making decisions, relating to others, understanding the impact of their behavior, etc.

The programs offer a scientist/practitioner model where students and faculty enhance science and learning through research and inquiry. Further, they learn to apply the principles learned in dealing with those whom they serve. Since their work is often highly personal and effective in others' lives, it is essential that students possess/develop high personal integrity and professional standards of ethical conduct. They must also develop the knowledge and skills essential to promote positive change in individuals struggling with important aspects of their lives.

The settings in which graduates serve include such places as public and private schools, colleges and universities, government and private helping agencies, hospitals, and private practice. Each program assists students in

developing a study list of appropriate courses and in acquiring appropriate practical experience under supervision. Students are also assisted in obtaining appropriate credentials, certifications, or licensure.

Six degrees are offered through the Department of Educational Psychology: Audiology—MS; Speech-Language Pathology—MS; Special Education—MS; Counseling and Guidance—MS; School Psychology—MS; and Counseling Psychology—PhD. The School Psychology—MS Program is an interdepartmental program cosponsored by the Educational Psychology and the Psychology departments and administered by the Educational Psychology Department.

The average number of students admitted each year varies by program as follows:

Audiology	8
Speech-Language Pathology	15
Special Education	20
Counseling and Guidance	16
School Psychology	8
Counseling Psychology	5

Audiology, Speech-Language, Special Education—MS

A master's degree in audiology or speech-language pathology consists of professional training and attainment of competencies that qualify graduates for admission to doctoral study, licensure, certification, and professional employment.

The goal of the special education master of science degree program is to prepare professionals for leadership positions in public schools. They will gain knowledge and skills in research, curriculum design, and evaluation of programs serving exceptional populations.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 1 (U.S. and international). Audiology and speech-language pathology admit fall semester and spring and summer terms. Special

education admits fall semester only, on either a part- or full-time basis.

- Application requirements: the entrance examination is the GRE general test. When taking the GRE, use the institutional number R 4019. Application will not be considered without GRE scores. Because of the nature of the clinical professions, both academic and personal qualifications are considered in selecting applicants and in evaluating, retaining, and graduating students.
- Prerequisite: appropriate educational and professional experience as determined by major area of study.

Requirements for Degree.

- Credit hours (36–42): depending on area of emphasis, minimum 36–42 hours of approved course work and thesis credit (6 hours).
- Required courses: consult departmental specialty area.
- Minor (optional): approved by graduate committee.
- Residence: at least one full semester's registration (9 credit hours minimum) must be completed on the BYU Provo campus.
- Thesis.
- Examinations: (A) written comprehensive and/or oral examination; (B) oral defense of thesis.

Note: EPsy 581R, 582R, 585R, 586R, 685R all require a \$40 fee in addition to tuition.

Counseling, School Psychology—MS

The program in counseling provides a series of courses and experiences to promote students' knowledge, skill, and scholarship in such areas as (a) individual and group counseling, (b) assessment, (c) career development, (d) leadership, and (e) research and evaluation. Students may emphasize counseling in either school or community settings or both. The majority of school counselors are employed at the secondary level, but some seek positions in elementary schools. Others work in college counseling or career centers, or in such student personnel

positions as placement, housing, admissions, student government, financial aid, etc.

Graduates emphasizing community counseling find employment as counselors in such agencies as mental health, family services, substance abuse treatment, career guidance, criminal justice systems, protective services, or industry. The School Psychology Program is a 66-semester-hour interdepartmental program cosponsored by the Educational Psychology and the Psychology Departments and administered by the Educational Psychology Department. During the first year, students complete a 38-semester-hour master of science degree in educational psychology. At the completion of the MS degree program, students continue for an additional 28-semester-hour certification program to qualify for state endorsement as a school psychologist. This second year includes a paid internship in a school setting, during which time students return to campus one day per week for course work. The program requires a project.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: the entrance examination is the GRE general test. When taking the GRE, use the institutional number R 4019. Application will not be considered without GRE scores. Because of the nature of the counseling and psychology professions, both academic and personal qualifications are considered in selecting applicants and in evaluating, retaining, and graduating students.
- Prerequisite: appropriate educational and professional experience as determined by major area of study. Adequate background in education and/or psychology; undergraduate major in one or the other is preferred but not necessary.

Requirements for Degree.

- Credit hours (38–48): depending on area of specialty, minimum 38–48

hours of approved course work including research, practicum, internship, and project or thesis.

- Required courses: consult department program documents.
- Minor (optional): approved by graduate committee.
- Residence: at least one full semester's registration (9 credit hours minimum) must be completed on the BYU Provo campus.
- Project paper or thesis
- Examinations: (A) written comprehensive and/or oral examination; (B) oral defense of thesis or project.
- Internship: see department program documents for specifics.

Note: EPsy 680R (school psychology) requires an \$80 fee.

Counseling Psychology—PhD

The PhD in counseling psychology is primarily psychological in nature and is based upon the scientist-practitioner model of training as recommended by the American Counseling Association and the American Psychological Association. The scientist-practitioner model is an integrated approach to training that acknowledges the interdependence of theory, research, and practice. The counseling psychology program at BYU emphasizes the educational, developmental, and preventive functions of counseling psychologists and counselor educators. Students are also prepared to intervene remedially with people who are experiencing abnormal development and psychopathology. Graduates of the program serve as counseling psychologists in colleges, university counseling centers, schools, private practice, and private and public agencies as well as counselor educators in university academic departments.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: the entrance examination is the GRE general test. When taking the GRE, use the institutional number R 4019. Application will not be considered without GRE scores. Because of the

nature of the counseling and psychology professions, both academic and personal qualifications are considered in selecting applicants and in evaluating, retaining, and graduating students.

- Prerequisite: master's degree in counseling or psychology or in an approved, closely related field; appropriate professional experience as determined by major area of study.

Requirements for Degree.

- Credit hours: minimum 94 hours, plus skill requirements.
- Required courses: consult department program documents.
- Minor (optional): approved by graduate committee.
- Residence: minimum two consecutive full-time semesters beyond the master's degree (minimum 9 credit hours each semester) on the BYU Provo campus.
- Skill requirement: consult department.
- Predoctoral internship (2,000 hours).
- Dissertation.
- Examinations: (A) written comprehensive examination at completion of course work; (B) oral defense of dissertation.

FINANCIAL ASSISTANCE

Most of the money that is available for student financial assistance in the Department of Educational Psychology will be given to graduate students in the form of graduate assistantships. Only those who are in extreme financial situations will be given serious consideration for supplementary awards.

Other sources of financial aid are available to students through the Financial Aid Office, A-41 ASB, PO Box 21009, Provo, UT 84602-1009.

Graduate Assistantships. A limited number of graduate assistantships are available for full-time students. These assignments require working with selected faculty members on research projects, curriculum development, and other university faculty assignments for 5 to 20 hours per week. A

student must apply for the assistantships *each* semester or term. Applications are due to the department secretary by the first priority registration deadline (see current class schedule).

Supplementary Awards. Applications for supplementary awards are reviewed on the basis of financial need. The award is either a one-quarter or one-half tuition waiver. Application forms are available in the department office, 328 MCKB, PO Box 25072, Provo, UT 84602-5072, and are due by the first priority registration deadline (see current class schedule). Applications should be turned into the department secretary.

Scholarships. A small number of modest, specific-interest scholarships are also available. Contact the department for application forms and additional information about these opportunities.

RESOURCES AND OPPORTUNITIES

Educational Psychology Center. This center affords students an opportunity to learn and practice a variety of applications for the principles and theories they study in their course work. Through practical applications students gain valuable experience in diagnosing learning and achievement difficulties; remedying learning and behavioral problems; consulting with parents, teachers, and other professionals regarding strategies for helping the center's clients; counseling individuals with academic, vocational, or personal problems; and giving career assessment and guidance to young people and adults.

Computer Laboratories. Terminals in the computer laboratories provide graduate students direct line access to the university's large mainframe computers, enabling students to use several sophisticated programs, such as SPSS and SAS, to analyze research data. These terminals also enable students to search out books in the Harold B. Lee Library.

Graduate Student Project and Research Laboratory. Laboratory space is provided for graduate students who are working with faculty on research, evaluation, and development projects.

Study Areas. Graduate study areas are available in the Project and Research Laboratory and the College of Education Learning Resource Center.

Faculty research interests vary among areas within the department.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin. For information on the audiology and speech-language pathology programs, write to 136 TLRB, PO Box 28605, Provo, UT 84602-8605, or call (801) 378-4318

COURSE DESCRIPTIONS

Note: EPsy 514R and 515R courses are for certification purposes only and are listed in the BYU Undergraduate Catalog. No graduate degree credit is given for 514R; 515R credit may count toward a graduate degree if prior approval is obtained from the graduate committee.

501. Test and Measurement Theory. (3)

Independent Study also; no graduate degree credit given for Independent Study.

Basic test and measurement theories. Types of tests. Reliability and validity. Standardization and test construction.

502. Child/Adolescent Psychopathology and Interventions in Schools. (3)

Etiology and diagnosis of dysfunctional behavior and maladjustment, with interventions for school-age children.

601. Advanced Educational Psychology. (3)

General educational psychology: learning theory, motivation, perception, development.

672. Empirical Inquiry in Education. (3)

Introduction to empirical research in education. Designing, conducting, analyzing, reporting, and evaluating empirical studies in education.

680R. Internship. (1-6)

Prerequisite: departmental consent.

690R. Seminar. (1-3)

Check current class schedule for seminar topics.

692R. Advanced Topics. (1-3)

693R. Directed Individual Study. (1-3)

Prerequisite: instructor's consent.

697R. Special Projects. (1-6)

Prerequisite: Stat 552 and EPsy 672 or equivalent.

699R. Master's Thesis. (1-6)

Counseling

546. Helping Relationships: Basic Concepts and Skills. (1-3)

Basic interviewing and helping skills. For students interested in professional, paraprofessional, peer, or lay counseling.

600. Introduction to Counseling and Guidance Services. (3)

Independent Study also; no graduate degree credit given for Independent Study.

Introduction to the counseling profession: history, philosophy, issues, trends, and current status. Role of counselor in school and community agency settings.

606. Psychoeducational Foundations of Counseling. (3)

Prerequisite: admission to graduate study in educational psychology.

Fundamental concepts and theories of motivation, human development, learning, personality, and abnormal psychology as they relate to counseling.

644. Career Development and Counseling. (3)

Theories of career development and choice with consideration of special populations. Application to life span and career counseling.

645. Appraisal Theory and Practice in Counseling. (3)

Testing and appraisal theory. Administration and interpretation of group standardized tests: personality, interest, relationship, achievement, ability, behavior, and career.

646. Counseling Theory and Interventions. (3)

Various theories of counseling, current research, and accepted practices.

647. Individual Intelligence Assessment in Education. (3)

Prerequisite: EPsy 625 and/or 645; instructor's consent.

Theory and experience in administering and interpreting individual intelligence tests in an educational setting.

648. Group Counseling and Interventions. (3)

Prerequisite: EPsy 646 or instructor's consent.

Various approaches to group counseling. Developing and participating in structured group experiences.

649. Human Growth and Development. (3)

Psychoeducational aspects of developmental theory across the life span, including psychosocial, moral, ego, cognitive, faith, and identity. Developmental implications in the counseling process.

650. Leadership in Counseling and Guidance. (3)

Leadership theory; organizing, administering ethics, and implementing counseling services in schools and other settings.

651. Social and Multicultural Aspects of Counseling and Psychology. (3)

Prerequisite: admission to graduate program in counseling and guidance, special education, school psychology, or counseling psychology.

Basic ethnic cultures: aging, gender, religious and socio-economic traditions, and issues. Multicultural counseling, testing, and helping theories and skills.

654. Educational and Career Guidance. (3)

Requirements for a resource center and comprehensive guidance model in public schools; knowledge of resources available in the community; applied approach to career guidance.

655. Issues and Interventions in Counseling and Mental Health. (3)

Human crises; preventive, developmental, and remedial interventions.

656. Religious Values and Methods in Counseling and Psychotherapy. (3)

Prerequisite: EPsy 646 or equivalent.

Religious values and spiritual perspectives, issues, and approaches in counseling and psychotherapy.

665. Career Assessment. (3)

Applying testing and measurement theory in areas of aptitudes, interests, and values in the counseling process.

678. Counseling Skills Practicum. (3)

Observing counseling techniques in settings where counseling takes place. Practicing beginning counseling skills. Laboratory required.

679. Counseling and Guidance Practicum. (3)

Prerequisite: EPsy 678; departmental approval of application and placement one semester in advance of registration.

Supervised beginning and intermediate counseling techniques and other responsibilities in school or community counseling settings. Laboratory required.

680R. Counseling and Guidance Internship. (2-6)

Prerequisite: EPsy 679; departmental approval of application and placement one semester in advance of registration.

Practicing individual and group skills, testing and other techniques, and responsibilities consistent with advanced master's students.

695R. Counseling Seminar. (1-3)

701R. Doctoral Seminar. (1-2)

Policies and procedures of the department, university, and profession.

705. Preventive and Developmental Methods in Counseling Psychology. (3)

Prerequisite: admission to PhD program in counseling psychology or instructor's consent.

Preventive and developmental interventions to enhance personal effectiveness; theory and practice in approaches to enhance wellness.

710. Ethics and Standards in Counseling Psychology. (3)

Ethics and standards applied to counseling and psychology, including legal issues, licensing, and professionalism.

715. Diagnosis of Psychological Problems in Counseling. (3)

Theory, diagnosis, and classification of emotional problems related to education, psychology, and counseling.

720. Fundamentals of Learning Theory and Cognitive Development. (3)

Learning and cognitive developmental theories and their application to behavioral change.

725. Theory and Practice of Objective Personality Tests: Including MMPI. (3)

Prerequisite: instructor's consent.

Administering and interpreting personality tests, including MMPI-2 and MMPI-A, with relevant application and current research.

745. Advanced Counseling Theory. (3)

Prerequisite: EPsy 646.

Various theoretical and practical approaches to counseling and therapy.

746R. Supervision Theory and Practice in Counseling. (3)

Prerequisite: EPsy 680R and instructor's consent.

Theoretical approaches to supervision of counseling; practice in supervising counselors-in-training.

748. Advanced Group Theory and Process. (3)

Prerequisite: EPsy 648.

Advanced theory of groups.

750. Research Theory and Methods in Counseling Psychology. (3)

Prerequisite: EPsy 672, Stat 552 or 501; admission to PhD program in counseling psychology.

Advanced counseling process and outcome research methods. Includes between groups, within-subjects experimental designs; quasi-experimental and times series designs; discovery-oriented, small N, and qualitative research strategies.

779R. Advanced Practicum in Counseling. (1-4)

Prerequisite: EPsy 680R; departmental consent and placement one semester in advance of registration.

780R. Doctoral Clerkship in Counseling. (2-8)

Prerequisite: EPsy 779; departmental consent; and application for clerkship one semester in advance of registration.

790R. Advanced Seminar. (1-4)

Prerequisite: departmental consent.

799R. Doctoral Dissertation. (1-9)

Prerequisite: completion of skill requirements.

Formal report and defense of substantive research topic designed to make an original contribution to knowledge in the field. Only 3 hours of 799R may be used in establishing residency requirements.

Special Education

505. Psycho-Educational Implications of Exceptionality.(1-3)

518. Education of the Gifted and Talented. (2)

Various approaches to educating the gifted and talented.

532. Assessment, Diagnosis, and Evaluation. (3)

Prerequisite: admission to special education master's program

Principles and concepts of effective assessment, diagnosis, and evaluation of individuals with disabilities.

533R. Practicum in Assessment, Diagnosis, and Evaluation. (3)

Prerequisite: admission to special education master's program

Practicum in assessment, diagnosis, and evaluation of individuals with disabilities.

534. Curricula and Effective Instruction. (3)

Prerequisite: admission to special education master's program

Curricula, principles, and concepts in effectively teaching individuals with disabilities.

535R. Practicum in Curricula and Effective Instruction. (3)

Prerequisite: admission to special education master's program

Practicum in instructional content and practices with individuals with disabilities in a variety of educational settings.

536. Managing Teaching and Learning Environments. (3)

Prerequisite: Admission to special education master's program

Principles, procedures, and concepts directly related to managing learning and teaching environments.

537R. Practicum in Managing Teaching and Learning Environments. (3)

Prerequisite: admission to special education master's program

Practicum in behavior and classroom management.

540. Applications of Technology in Special Education. (3)

Review of computer software, hardware, and assistive devices for individuals with disabilities.

580R. Directed Observation in the Schools. (1-3)

Prerequisite: instructor's consent.

581R. Practicum: Individuals with Mental Retardation. (1-8)

Prerequisite: EPsy 520; departmental approval of application and placement one semester in advance of registration. Fee.

586R. Practicum: Individuals with Mild and Moderate Disabilities. (1-8)

Prerequisite: EPsy 503; departmental approval of application and placement one semester in advance of registration. Fee.

603. Guidance and Counseling of the Exceptional Child. (3)

604. Special Education Services in Public Schools. (2)

609. Assessment, Diagnosis, and Evaluation: Mild/Moderate Populations. (3)

Prerequisite: EPsy 532, 533R.

Advanced concepts and principles in assessment, diagnosis, and evaluation of individuals with mild/moderate disabilities.

611R. Practicum in Assessment, Diagnosis, and Evaluation: Mild/Moderate Populations. (3)

Prerequisite: EPsy 532, 533R.

Advanced practicum in assessment, diagnosis, and evaluation of individuals with mild/moderate disabilities.

612R. Curricula and Effective Instruction: Mild/Moderate Populations. (3)

Prerequisite: EPsy 534, 535R.

Advanced concepts and skills in developing curriculum and using specialized instructional approaches for individuals with mild/moderate disabilities.

613. Practicum in Curricula and Effective Instruction: Mild/Moderate Populations. (3)

Prerequisite: EPsy 534, 535R.

Advanced practicum in instructional content and practice with individuals having mild/moderate disabilities.

614. Managing Teaching and Learning Environments: Mild/Moderate Populations. (3)

Prerequisite: EPsy 536, 537R.

Advanced procedures and concepts in managing learning and teaching for individuals with mild/moderate disabilities.

615R. Practicum in Managing Teaching and Learning Environments: Mild/Moderate Populations. (3)

Prerequisite: EPsy 536, 537R.

Advanced practicum in managing learning and teaching for individuals with mild/moderate disabilities.

625R. Psychological-Educational Assessment of Learning. (3)

Prerequisite: instructor's consent.

626. Advanced Curriculum in Special Education. (3)

Prerequisite: EPsy 205 or equivalent.

631. Assessment, Diagnosis, and Evaluation: Severe/Profound Populations. (3)

Prerequisite: EPsy 532, 533R.

Advanced concepts and principles in assessment, diagnosis, and evaluation of individuals with severe/profound disabilities.

632R. Practicum in Assessment, Diagnosis, and Evaluation: Severe/Profound Populations. (3)

Prerequisite: EPsy 532, 533R.

Advanced practicum in assessment, diagnosis, and evaluation of individuals with severe/profound disabilities.

634. Curricula and Effective Instruction: Severe/Profound Populations. (3)

Prerequisite: EPsy 534, 535R.

Advanced concepts and skills in developing curriculum and using specialized instructional approaches for individuals with severe/profound disabilities.

635R. Practicum in Curricula and Effective Instruction: Severe/Profound Populations. (3)

Prerequisite: EPsy 534, 535R.

Advanced practicum in instructional content and practice with individuals having severe/profound disabilities.

636. Managing Teaching and Learning Environments: Severe/Profound Populations. (3)

Prerequisite: EPsy 536, 537R.

Advanced procedures and concepts in managing learning and teaching environments for individuals with severe/profound disabilities.

637R. Practicum in Managing Teaching and Learning Environments: Severe/Profound Populations. (3)

Prerequisite: EPsy 536, 537R.

Advanced practicum in managing learning and teaching environments for individuals with severe/profound disabilities.

680R. Internship. (2-6)

Prerequisite: departmental approval of application; placement one semester in advance of registration.

Practicing individual and group skills, testing, and other techniques and responsibilities consistent with advanced master's students.

690R. Seminar in Special Education. (1-3)

School Psychology

502. Child/Adolescent Psychopathology and Intervention in Schools. (3)

610. School Psychology Issues and Consultation. (3)

Role of school psychologists and their functions in various settings. Models and methods of consultation with teachers, parents, and professionals.

680R. Internship. (2-6)

Prerequisite: departmental approval of application and placement one semester in advance of registration; EPsy 690R concurrently.

Practicing individual and group skills, testing, and other techniques and responsibilities consistent with advanced master's students.

690R. Seminar in School Psychology. (1-3)

Prerequisite: EPsy 680R concurrently.

Discussion of problems and issues in school psychology.

Audiology

500. Clinical Data Acquisition and Analysis. (3)

Prerequisite: Stat 222.

Research methods in audiology and speech language pathology; applying statistical techniques; professional literature and writing.

544. Psychoacoustics. (3)

Advanced studies in human psychoacoustics and hearing science.

616. Acoustic Impedance Measures. (2)

Middle ear measurements and special test applications.

617. Auditory Evoked Potentials. (3)

Theoretical and practical application of electrocochleography, brain stem, middle latency, long latency, and cognitive evoked potentials.

618. Otoacoustic Emissions and Vestibular Evaluation. (3)

Theoretical and practical application of otoacoustic emissions and vestibular evaluation.

638. Advanced Hearing Tests and Measures. (3)

Advanced audiometric procedures assessing impaired hearing.

639. Community and Industrial Audiology. (2)

Hearing problems in industry; legal implications.

641. Hearing Aids. (3)

Assessing hearing aid performance; the art of fitting hearing aids.

643. Adult Aural Rehabilitation. (2)

Rehabilitative audiology for hearing-impaired adults.

671. Instrumentation-Calibration. (2)

Calibration of audiological instruments.

673. Pathologies of the Auditory Mechanism. (3)

Prerequisite: EPsy 334, 438.

Hearing disorders of outer, middle, and inner ear and central auditory pathway.

680R. Internship. (2-6)

Prerequisite: instructor's consent four weeks in advance of registration.

Practicing individual and group skills, testing, and other techniques and responsibilities consistent with advanced master's students.

685R. Practicum in Clinical Audiology. (1-8)

Prerequisite: instructor's consent.

690R. Seminar in Audiology. (1-3)

690R. Seminar in Hearing Disorders. (1-3)

694R. Special Projects in Clinical Audiology. (1-3)

Prerequisite: instructor's consent.

699R. Master's Thesis. (1-6)

Speech-Language Pathology

A full undergraduate program in speech-language pathology must be completed before taking any of the following graduate courses; or additional prerequisite courses must be taken.

500. Clinical Data Acquisition and Analysis. (3)

Prerequisite: Stat 222.

Research methods in audiology and speech language pathology; applying statistical techniques; professional literature and writing.

573. Aphasia. (3)

Perspectives on the neurology, clinical assessment, and rehabilitation of aphasic language disturbances in adults.

574. Communicative Disorders of Individuals with Severe Disabilities. (3)

Assessment and treatment of persons with multiple handicaps, including augmentative communication training.

575. Motor Speech Disorders. (3)

Neuropathology, symptomology, clinical assessment, and treatment of adult motor speech disorders.

630. Theories of Child Language Acquisition. (3)

Process models in lexical, prosodic, syntactic, and semantic facets of first language.

633. Dysphagia and Head Trauma Management. (2)

Acquired swallowing and eating disorders, rehabilitation of dysphagia, and traumatic brain injury and cognitive rehabilitation therapy.

636. Multicultural Issues in Speech-Language Pathology. (3)

Prerequisite: EPsy 350 or equivalent.

Speech and language assessment and intervention with persons from culturally and linguistically diverse backgrounds. Specific topics include cultural diversity, bilingualism, and use of interpreters/translators.

657. Voice Disorders. (3)

Assessment and treatment of disorders of the speaking voice.

662. Maxillofacial and Related Disorders of Human Communication. (2)

680R. Internship. (3)

685R. Practicum in Speech-Language Pathology. (1-8)

Prerequisite: instructor's consent.

690R. Seminar in Language Disorders. (3)

690R. Seminar in Speech Pathology. (3)

690R. Seminar in Computer Language Assessment. (1-3)

694R. Special Projects in Speech-Language Pathology. (1-3)

699R. Thesis. (1-6)

FACULTY

ALLRED, KEITH W., *Assistant Professor*. PhD, Vanderbilt University, 1988. Special Education.

BINGHAM, RONALD D., *Professor*. PhD, Pennsylvania State University, 1970. Counseling; Mental Health.

BRINTON, BONNIE, *Professor*. PhD, University of Utah, 1981. Child Language Development; Language Disorders.

BROWN, GAIL W., *Assistant Professor*. PhD, University of Utah, 1988. School Psychology.

CHANNELL, RON W., *Associate Professor*. PhD, University of Utah, 1983. Developmental Psycholinguistics.

EGAN, M. WINSTON, *Associate Professor*. PhD, University of Florida, 1974. Special Education; Behavior Disorders.

FISCHER, LANE, *Assistant Professor*. PhD, University of Minnesota, 1991. Counseling; School Psychology.

FUJIKI, MARTIN, *Professor*. PhD, University of Utah, 1980. Normal Language Acquisition; Language Development.

GALE, DARWIN F., *Professor*. EdD, Brigham Young University, 1967. Learning Theory; Motivation.

HANKS, WENDY, *Assistant Professor*. PhD, Wichita State University, 1985. Pediatric and Rehabilitative Audiology.

HARRIS, RICHARD W., *Professor*. PhD, Purdue University, 1978. Hearing Science; Perception.

HEAPS, RICHARD A., *Professor*. PhD, University of Utah, 1970. Counseling; Victims of Disaster.

HILTON, LAURENCE M., *Professor*. PhD, Northwestern University, 1973. Communication Sciences and Disorders.

INGRAM, CREGG F., *Professor*. EdD, University of Kentucky, 1974. Special Education; Instructional Systems.

ISAKSON, RICHARD L., *Associate Professor*. PhD, Cornell University, 1975. Counseling.

JOHNSON, RICHARD W., *Professor*. PhD, Brigham Young University, 1968. Counseling.

KRAMER, GARY L., *Professor*. PhD, Oregon State University, 1977. Educational Psychology.

LUCIDO, BONNIE RAE, *Assistant Professor*. PhD, University of Utah, 1994. Speech-Language Pathology.

MCPHERSON, DAVID L., *Professor*. PhD, University of Washington, 1972. Audiology; Hearing Science; Electrophysiology.

MOURITSEN, MAREN M., *Associate Professor*. EdD, Columbia University, 1979. Educational Psychology.

RICHARDS, P. SCOTT, *Associate Professor*. PhD, University of Minnesota, 1982. Counseling; Religious Values.

ROWE, FRED A., *Associate Professor*. EdD, Arizona State University, 1975. Career Guidance; Hardiness.

TODD, SALLY M., *Associate Professor*. PhD, University of Arizona, 1973. Educational Psychology; Gifted and Talented.

WARD, G. ROBERT, *Professor*. PhD, Michigan State University, 1965. Counseling.

WINWARD, EDWARD J., *Associate Professor*. PhD, University of Missouri, Rolla, 1966. Tests and Measurements.

YOUNG, JAMES R., *Associate Professor*. PhD, George Peabody, 1970. Educational Psychology.

ELECTRICAL AND COMPUTER ENGINEERING

Chair: Brent E. Nelson

Graduate Coordinator: Wynn C. Stirling

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THE PROGRAM OF STUDIES

Electrical engineering has its origins in the study and application of electrical phenomena. However, in recent years the field has grown to embrace a diverse range of problems in applied physics and mathematics. The department currently offers advanced study in four broad areas.

- Computer engineering concentrates on the architecture and implementation of digital logic and computing systems.
- Electromagnetics explores the theory, physical properties, and applications of electromagnetic and optical radiation.
- Microelectronics and VLSI focuses on the design and fabrication of microelectronic circuits for digital and analog applications, including device physics, modeling, processing, and fabrication.
- Signals and systems studies fundamental and applied issues in information processing and includes emphases in Communication Theory, Control Theory, Digital Signal Processing, and Estimation Theory.

Specific research activities in these broad areas are described on the department World Wide Web page at <http://www.ee.byu.edu>.

Three graduate degrees are offered through the department: Electrical Engineering—MS; Engineering Management—MEM; and Engineering—PhD.

Electrical Engineering—MS

The MS degree concentrates on establishing a sound theoretical foundation and on exposing students to advanced developments. Graduate courses are typically more abstract than undergraduate courses. They require more critical thinking and a higher level of mathematical and algorithmic facility. Students who complete the MS degree find that they are better prepared to remain technically current in this rapidly changing field, and many are able to make the transition from learner to discoverer. As a result, companies increasingly view the MS as the working, or professional, degree. The MS degree typically takes from one to one and a half years to complete.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1; winter, September 15.
- Application requirements: GRE general exam is required of all applicants with a BS degree from a non-ABET accredited program.
- Prerequisite: BS degree in electrical/computer engineering or allied discipline with departmental consent. Minimum 3.0 GPA for the last 60 credit hours of technical coursework.

Requirements for Degree.

The general requirements for the degree are listed below. Detailed information on the degree requirements is available from the department office.

- Credit hours: minimum 34 credit hours.
- Required courses: ECEn 691R (minimum two semesters)

Theoretical Foundation Courses (minimum 6 hours): a master's degree implies a rigorous theoretical understanding. The department requires the course of study to include classes devoted to the theoretical foundations and appropriate formalisms of the student's specialty as chosen in consultation with advisor. *Emphasis Courses* (minimum 18 hours): the MS degree also implies mastery of a body of knowledge

and practice. The course of study should have a well-defined focus aimed at producing competence in all areas of interest. All 500- and 600-level courses in the Electrical and Computer Engineering Department are acceptable for an MS degree. Courses from other departments may also be acceptable but will need approval from an advisor and the graduate coordinator; *Thesis Option*: 6–9 hours of ECEn 699R. **Note:** Although the above courses are allowed, students must receive the approval of the graduate committee and the graduate coordinator before any of the courses can apply toward their graduate degree.

- Study list: the graduate study list must be submitted during the first semester of graduate study.
- Residency requirements: residency is required for the major part of the work toward the master of science thesis. This work must be completed under the specific direction of a graduate faculty member while the student is in residence at BYU (at least two consecutive full-time semesters). "In residence" is defined as (1) being registered for credit as a graduate student and (2) living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty. Further, all work applying toward any master's project or thesis must be completely open for university review and publication. Any exceptions to the above must be supported by written approval from the department and college and obtained in advance of any work being performed.
- Examinations (to be completed by the end of the third full semester in the graduate program): (A) thesis program, oral defense of thesis; (B) nonthesis program, final comprehensive written examination over master's course work.
- Thesis (for thesis option candidates).

Engineering Management—MEM

The MEM is jointly sponsored by the Marriott School of Management and the College of Engineering and Technology. As such, the program incorporates increased technical learning in electrical and computer engineering with those skills needed to become an efficient and effective manager. With this focus the type of career preparation gained will allow the student to remain in professional engineering activities and yet be capable of working with managers or becoming a manager of technical activities.

The majority of MEM graduates go out as engineers but more fully prepared to move into management positions. The program offers the student an increased awareness of the interrelationship of engineering, marketing, production, finance, operations management, accounting, and other essential managerial skills.

MEM students who wish to take electrical and computer engineering courses for a specialization in this area should consult the graduate coordinator to be assigned an advisor.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 1 (U.S. and international). Fall semester entrance is strongly recommended. Entry spring and summer terms is available but will extend the length of the program.
- Application requirements: the entrance examination is the GRE general test for applicants from non-ABET (Accreditation Board for Engineering and Technology, Inc.) accredited institutions. Indicate in writing a desire to be considered for the program. Submit application to Graduate Admissions, B-356 ASB, PO Box 21341, Provo, UT 84602-1341.
- Prerequisite: baccalaureate degree in engineering.

Requirements for Degree.

- Credit hours (40): minimum 40 course work credit hours.

- Basic curriculum requirements: *fall semester*—Mgt 501 (3), 561 (3), EngT 500 (1), technical electives (6); *winter semester*—Mgt 511 (3), 541 (3), 562 (3), EngT 501 (1), technical elective (3); *spring term*—Mgt 551 (3), technical elective (3); *summer term*—Mgt 580 (3), 565 (2), technical elective (3). See p. 116 for course descriptions.

Financial Assistance.

Scholarship funds are available from the Jerry Christiansen Scholarship funds.

Engineering—PhD

The PhD is a specialized degree oriented toward research. Students work with faculty advisors on topics that may have lasting influence on our theoretical understanding or on professional practice. Successful PhD candidates must demonstrate, in addition to the skills required for the MS degree, an ability to identify, investigate, formulate and solve new problems of interest. They must also communicate the results of their work to colleagues in an articulate and persuasive fashion.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1; winter, September 15.
- Application requirements: no entrance examination is required for applicants who hold a BS or MS degree from U.S. or Canadian schools. However, international students must submit GRE general test and advanced engineering subject test scores as well as TOEFL scores (577 minimum).
- Prerequisite: BS degree in electrical/computer engineering or allied discipline with departmental consent. Minimum 3.0 GPA for the last 60 credit hours of technical coursework.

Requirements for Degree.

- The general requirements for the degree are listed below. Detailed information on the degree requirements is available from the department office.
- Credit hours: minimum 68 semester hours, at least 50 of which must be

course work beyond the baccalaureate degree, plus 18 hours of dissertation (ECEn 799R).

Candidates Without a Master's Degree: 50 hours, a minimum 38 of them in graduate-level courses. At least 12 hours of the 50 must be advanced mathematics, statistics, or science (a portion of which may be upper-division undergraduate level, with specific departmental approval) and a minimum 18 hours of dissertation (ECEn 799R).

Candidates with a Master's Degree: with committee approval up to 20 hours of previous graduate work, including 4 hours of thesis, may apply toward the doctorate. In addition, other courses taken in the master's program may apply toward the required 12 hours of advanced mathematics, statistics, or science with departmental approval.

- Required courses: ECEn 791R each semester of residence (only 1 credit hour may apply toward the minimum semester hours required [68]).
- Electives: determined in consultation with graduate committee.
- Study list: the graduate study list must be submitted during the first semester of doctoral study.
- Residency requirements: see residency requirements listed in the preceding Electrical Engineering—MS section.
- Comprehensive qualifying examination: students must take the written comprehensive exam, based on graduate course work, by the end of the fourth semester. If a student does not pass, it must be retaken the next time it is offered. Subsequent repetitions of the exam should be rare and will require approval of the graduate committee.
- Oral qualifying exam: an oral research report on an assigned topic must be presented by the end of the fourth semester.
- Admission to candidacy: the graduate committee will use the results of the written and oral exams, along with the advisor's recommendation, to determine candidacy status.
- Prospectus: students must submit a written prospectus by the end of the fifth semester. The signatures of five

faculty members who agree to advise the student on the proposed research topic must be obtained. If the research topic changes significantly, then this process must be repeated.

- Dissertation.
- Oral defense of dissertation.

FINANCIAL ASSISTANCE

The department provides as much financial assistance to graduate students as is available within departmental and university guidelines. To be considered for financial aid for fall semester, new students must submit all application materials before February 1. Financial awards will be announced in March. Students should obtain application details from the graduate secretary. The following types of aid are available:

Tuition Waivers. The department offers a limited number of full and partial tuition waivers on a competitive basis. All graduate students in good standing may apply for these waivers.

Teaching / Research Assistantships. The department awards a limited number of teaching/research assistantships to full-time graduate students in good standing. These assistantships are renewable annual appointments that require the student to serve as a teaching assistant for two semesters and provide matching research funds in addition to tuition benefits. To qualify, students must commit to a research-oriented graduate program and obtain academic sponsorship from a member of the faculty.

Research Assistantships. Full-time graduate students in good standing may be awarded research assistantships to assist faculty with externally funded research. Arrangements must be made with individual faculty members.

Fellowships. The department awards a limited number of research fellowships on a competitive basis to full-time graduate students in good standing.

RESOURCES AND OPPORTUNITIES

The Department of Electrical and Computer Engineering maintains a variety of facilities to support the diverse research efforts of the graduate faculty. Facilities include

- extensive PC and Unix workstation computer resources,
- signal processing software tools,
- image display and digitizing equipment
- a sound room for acoustic and audio signal processing research,
- a well-equipped clean room for fabrication of semiconductor and electro-optical devices,
- a microwave remote sensing laboratory,
- an antenna range,
- an electro-optics laboratory equipped with lasers and optical fiber equipment,
- a digital communications and error control coding laboratory,
- a digital signal processing laboratory with extensive audio and image processing equipment, and
- a reconfigurable logic laboratory.

For a description of current research activities associated with each facility, see the department World Wide Web page at <http://www.ee.byu.edu>.

COURSE DESCRIPTIONS

510. (ECEn-Stat 545) Stochastic Processes. (3)

Prerequisite: Stat 421 or 520.

Review of elementary probability: expectation, characteristic functions, limit theorems. Introductory random processes: definitions and properties, covariance and spectral density, time average, stationarity, ergodicity, linear system relations, mean square estimation, Markov processes.

511. Introduction to Linear System Theory. (3)

Prerequisite: ECEn 411.

Finite-dimensional linear systems. State variable realizations, canonical forms, controllability, observability, minimality. Time and frequency domain design of controllers and observers.

512. Active and Passive Filter Design. (3)

Prerequisite: ECEn 315.

Design and frequency response characteristics of active and passive filters with emphasis on applications to signal processing.

514. Digital Signal Processing Laboratory 1. (1)

Prerequisite: ECEn 315 or concurrent registration.

Testing signal processing algorithms and concepts using digital computer. Discrete convolution, DFT, and digital filters.

515. Data Acquisition Systems. (3)

Prerequisite: ECEn 313, 315.

Components and their characteristics required to convert physical variables to digital data. Relationship between digital data word bit size and component characteristics.

516. Adaptive Processing. (2)

Prerequisite: ECEn 315.

Adaptive digital filter theory, LMS adaptive algorithms, applications to learning filters, noise cancellation, and adaptive antenna arrays.

517. Digital Filters and Signal Processing. (3)

Prerequisite: Math 322 or 332; ECEn 315 and concurrent registration in 510.

Digital filters and their application to signal processing.

518. Digital Signal Processing Laboratory 2. (1)

Prerequisite: ECEn 517 or concurrent registration.

Advanced laboratory experience in computer processing of digital signals and signals in discrete format.

519. Digital Image Processing. (3)

Prerequisite: ECEn 510, 517.

Digital processing techniques for two-dimensional scene analysis, classification feature enhancement, contrast enhancement deblurring, data compression, etc.

520. Error-Control Codes. (3)

Prerequisite: senior or graduate standing.

Theory and implementation of error control techniques for digital communications, computer, and storage systems. Includes block, cyclic, and convolutional codes.

522R. Special Topics in Computer Systems. (1-3)

Prerequisite: instructor's consent.

523. Computer Network Queuing. (3)

Prerequisite: concurrent registration in ECEn 315; Stat 421.

Queuing concepts related to computer systems and networks, resource allocation, speed, service time. Applications of random variables and probability theory.

526. Local Computer Networks. (3)

Prerequisite: ECEn 327.

Local computer network coupling fundamentals.

528. Computer Systems Architecture. (3)

Prerequisite: ECEn 425.

Advanced topics in computer architecture and parallel processing.

529. Advanced Computer System Design Lab. (3)

Prerequisite: ECEn 425, 451.

Lab experience in design and analysis of advanced computer systems.

540. Detection and Estimation Theory. (3)

Prerequisite: ECEn 510 or equivalent.

Basic concepts of detection and estimation theory, including sufficiency, completeness; Neyman Pearson and Bayes detectors; maximum likelihood, Bayes, minimum mean square, and linear estimation, Kalman filters.

542R. Special Topics in Electronics. (1-3)

Prerequisite: instructor's consent.

544. Digital Communication Theory. (3)

Prerequisite: ECEn 444, 510.

Theory and design of optimal digital communication systems with noise, matched filters, correlation detectors, convolution codes, sequential coding/decoding schemes, block coding, and spread spectrum.

545. Information and Coding Theory. (3)

Prerequisite: ECEn 315, Stat 421.

Mathematical development of information and coding theory applied to communication and other stochastic processes.

546. Optical Communication Components and Systems. (3)

Prerequisite: ECEn 460.

Fiber-optic communication system components and their operating and performance characteristics.

547. Satellite Communications Systems. (3)

Prerequisite: ECEn 444.

Satellite communication system design including satellite transponders, microwave components, earth station hardware, link budgets, and analog and digital modulation formats.

550. Device Electronics for Integrated Circuits. (3)

Prerequisite: ECEn 450.

Semiconductor device analysis and simulation. Analog integrated circuit design.

551. VLSI Systems Design. (3)

Prerequisite: ECEn 451.

Design of structured circuit systems for very large-scale integrated semiconductor chips. Architecture of digital VLSI systems.

553. VLSI Process Technology. (3)

Prerequisite: senior or graduate standing in engineering or physical sciences.

Physical and chemical process steps used in fabricating very large-scale integrated circuits on monolithic silicon crystal.

555. VLSI Testing. (1)

Prerequisite: ECEn 451.

Testing of ICs designed previous semester in ECEn 451. Topics in VLSI-testable circuit designs.

560. Intermediate Electromagnetic Theory. (3)

Prerequisite: ECEn 460. Recommended: Math 323.

Application of electromagnetic theory to nonlinear and anisotropic materials and devices. Current mathematical techniques in field theory.

561. High-Frequency Communication Circuits. (4)

Prerequisite: ECEn 443, 460.

Circuits and RF techniques used in communication systems.

563. Antenna Theory. (3)

Prerequisite: ECEn 460.

Radiation, terminal, and distributed properties of antenna structures. Effects of lossy and ionized media on antenna performance. Noise temperature.

564. Radar Systems Performance. (3)

Prerequisite: ECEn 444, 460.

Performance and evaluation of various radar systems. Range equation, signal detection, ambiguity function, system configurations, and components.

568. Microwave Remote Sensing. (3)

Prerequisite: instructor's consent.

Emphasis on space-borne remote sensing of earth's atmosphere, land, and oceans. Primary methods and applications for both active (radar) and passive (radiometry).

593R. Special Topics in Electrical Engineering. (3)

Prerequisite: instructor's consent.

Topics vary. Recent developments in electrical engineering.

598R. Special Problems. (3)

Prerequisite: instructor's consent.

611. Optimal Control. (3)

Prerequisite: ECEn 511.

Optimization theory for controller design: finite and infinite horizon regulators, linear quadratic regulator design, terminal and path constraints, introduction to H-infinity theory.

612. System Identification. (3)

Prerequisite: ECEn 510, 511.

Parametric identification; identifiability theory, autoregressive/moving average models; nonparametric identification of linear and nonlinear systems using higher-order statistics and Volterra and Wiener models; state space methods.

617. Advanced Digital Signal Processing. (3)

Prerequisite: ECEn 517; ECEn 510 or Stat 545.

Advanced topics in digital signal processing, including multirate DSP. Array processing and beam forming, model-based spectral estimation, advanced optimal filtering techniques, current research review.

619. Advanced Image Processing. (3)

Prerequisite: ECEn 517, 519; ECEn 510 or Stat 545.

Advanced topics in digital image processing, including reconstruction from projections, topics from computer vision, biomedical imaging, acoustic imaging, and current research review.

644. Pattern Recognition. (3)

Prerequisite: ECEn 315; Stat 421.

Decision surfaces and Bayesian theory applied to multidimensional pattern analysis and recognition with and without training data.

646. Optimal Estimation Theory. (3)

Prerequisite: ECEn 510, 544.

Optimal filtering techniques, including Wiener and Kalman filtering. Estimating signal parameters in noise.

661. Advanced Electromagnetic Fields. (3)

Prerequisite: ECEn 560.

Physical interpretation of electromagnetic fields. Mathematical methods of solving boundary value and other field problems.

691R. Graduate Seminar. (0.5)

Technical presentations by graduate students, faculty members, and invited guests.

699R. Master's Thesis. (1-9)

Prerequisite: graduate standing and major professor's consent.

791R. Seminar for Doctoral Students. (0.5)**794R. Selected Topics in Electrical and Computer Engineering. (1-3)****797R. Research for Doctoral Students. (1-9)****799R. Doctoral Dissertation. (1-9)****FACULTY**

ARCHIBALD, JAMES K., *Associate Professor*. PhD, University of Washington, 1987. Computer Architecture; Parallel Processing.

ARNOLD, DAVID V., *Assistant Professor*. PhD, Massachusetts Institute of Technology, 1992. Electromagnetic Wave Theory.

BEARNSON, LEROY WOOD, *Associate Professor*. PhD, Auburn University, 1970. Computer Communication; Error Correction; Networking.

CHABRIES, DOUGLAS M., *Professor*. PhD, Brown University, 1970. Digital Signal Processing; Adaptive Filtering; Image and Sonar Processing.

CHRISTIANSEN, RICHARD, *Professor*. PhD, University of Utah, 1976. Digital Signal Processing.

COMER, DAVID JOHN, *Professor*. PhD, Washington State University, 1966. Electronics; Circuit Theory.

COMER, DONALD T., *Professor*. PhD, University of Santa Clara, 1968. Mixed Signal VLSI.

FROST, RICHARD L., *Associate Professor*.
PhD, University of Utah, 1979.
Digital Signal Processing;
Information Theory; Image
Processing; Neural Networks.

HUTCHINGS, BRAD L., *Assistant Professor*. PhD, University of Utah, 1992. Reconfigurable Logic; FPGA's VLSI Design.

JEFFS, BRIAN D., *Assistant Professor*.
PhD, University of Southern California, 1989. Digital Signal Processing; Digital Image Processing; Biomedical Imaging.

JENSEN, MICHAEL, *Assistant Professor*.
PhD, University of California, Los Angeles, 1994. Numerical Methods in Electromagnetics; Antenna Theory.

LONG, DAVID G., *Associate Professor*.
PhD, University of Southern California, 1989. Microwave Remote Sensing; Estimation Theory; Radar.

MINER, GAYLE E., *Professor*. PhD, University of California, Berkeley, 1969. Electromagnetic Theory; Fiber Optics; Data Acquisition.

NELSON, BRENT E., *Associate Professor*.
PhD, University of Utah, 1984. VLSI Design; Computer Systems Design.

RICE, MICHAEL, *Assistant Professor*.
PhD, Georgia Institute of Technology, 1991. Digital Communication Theory; Error-Control Coding; Satellite Communications.

SALMON, LINTON G., *Associate Professor*. PhD, Cornell University, 1983. Integrated Circuit Processing; Modeling; High-Speed Packaging.

SELFIDGE, RICHARD H., *Associate Professor*. PhD, University of California, Davis, 1984. Fiber and Integrated Optics; Electromagnetics; Lasers.

STIRLING, WYNN C., *Professor*. PhD, Stanford University, 1983. Linear System Theory; Estimation and Detection Theory; Control Theory.

SWINDEHURST, ARNOLD LEE, *Assistant Professor*. PhD, Stanford University, 1991. Estimation Theory; Signal Processing; Controls.

WILDE, DORAN, *Associate Professor*.
PhD, Oregon State University, 1995. Regular Array Architectures; Computation.

ELEMENTARY EDUCATION

Chair: D. Ray Reutzel
Graduate Coordinator: J. Lloyd Eldredge

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PO Box 25099
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THE PROGRAM OF STUDIES

The Department of Elementary Education offers graduate programs in teaching/learning and reading. Master's programs are designed to improve the art and science of teaching or to prepare educators to function as curriculum specialists. The doctorate program is designed to prepare educators to function in the following career roles: diagnostic-remedial reading specialist, developmental reading specialist, reading consultant/coordinator/supervisor, or university professor. In addition, a doctorate degree with an emphasis in literacy education is offered jointly with the Department of Instructional Science. This program is designed to prepare students to function as literacy researchers in government, church, or university settings.

Three degrees are offered through the Department of Elementary Education: Teaching and Learning—MA, Teaching and Learning—MEd, and Reading—EdD. A PhD in literacy education is also offered through the Instructional Science Department.

The department accepts up to twenty-six graduate students per year. Master's students generally complete their program in two years, whereas doctoral students average about three and half years to complete their program.

Teaching and Learning—MA, Teaching and Learning—MEd

The MA and MEd programs in teaching and learning provide two options for completing graduation

requirements. The student may elect the summer residency program or the full-time, on-campus program. The summer residency option consists of a minimum of three full-time summers on the campus, with intervening supervised field experiences during the fall and winter semesters. The on-campus program is for those who attend the university as full-time students. Both programs, MA and MEd, are designed for fall, winter, and summer entrance.

Admission and Entry.

- Semesters of entry and application deadlines: fall, summer, February 1; winter, September 15.
- Application requirements: minimum required 3.25 GPA for last 60 hours; one year of successful teaching experience.
- Entrance examination: GRE general test. Scores (not to be more than five years old) must be submitted to Department of Elementary Education when applying.

Requirements for Degree.

- Credit hours (36): minimum 36 course work hours.
- Required courses: determined in consultation with graduate committee. A maximum of 10 semester hours of approved graduate transfer credit is allowed. Faculty recommendation upon completion of EIED 672R.
- Residency: full-time, on-campus program—two consecutive full-time semesters.
- Summer residency: minimum three consecutive full-time summer terms with supervised course work during fall and winter semesters for two years.
- Thesis (MA: 6 hours, EIED 699R) or professional improvement project (MEd: 3 hours, EIED 693R, 695R, 696R).
- Examinations: (A) comprehensive written or oral examination; (B) oral defense of thesis or project.

Reading—EdD

The EdD program in reading is designed to help students focus on spe-

cific career goals, and specific programs are developed by students and faculty to help students prepare themselves for these careers (professor, reading specialist, etc.).

Admission and Entry.

- Semesters of entry and application deadlines: fall, summer, February 1; winter, September 15.
- Application requirements: minimum 3.25 GPA for last 60 hours. Successful completion of three years of acceptable professional teaching experience in education or equivalent experience. Admission application evaluated by department graduate faculty. Admission considered according to the resources available.
- Entrance examination: GRE general test. Scores (not to be more than five years old) must be submitted to Department of Elementary Education when applying

Requirements for Degree.

- Credit hours (95): minimum 95 hours, including 12 dissertation hours (EEd 799R). Up to 36 hours from an approved master's degree may apply.
- Skill requirements (included in 95 required hours).
- Courses required: IS 651, Quantitative Reasoning; IS 653, Measurement Theory; IS 672, Empirical Inquiry in Education, or EEd 672R, Introduction to Research Design.
- Required courses: 36 hours required in reading, including 12 hours of dissertation. A minimum 12 hours must be taken outside the College of Education or concentrated within another department of the college. Remaining hours to be determined in consultation with graduate committee.
- Residency: two consecutive full-time semester registrations (9 hours each).
- Dissertation.
- Examinations: (A) written and oral comprehensive examinations taken upon completion of course requirements; (B) oral defense of dissertation.

- Time limit: graduate within eight years following admission.

Literacy Education—PhD

For this area of specialization, interested students should consult the Instructional Science Department or refer to the PhD listing under the Instructional Science section of this catalog.

FINANCIAL ASSISTANCE

A limited number of departmental graduate and research assistantships are available. To qualify, a student must be registered full-time. Most assignments are in supervisory positions over elementary education undergraduate majors.

RESOURCES AND OPPORTUNITIES

Computer Laboratory with Access to VAX. Computer terminals in the laboratory provide graduate students direct line access to the university's large mainframe computers, enabling students to use several sophisticated programs, such as SPSS and SAS, to analyze research data. These terminals also enable students to search out books in the Harold B. Lee Library.

Graduate Student Project and Research Laboratory. Laboratory space is provided for graduate students who are working with faculty on research, evaluation, and development projects.

Study Areas. Graduate study areas are available in the Project and Research Laboratory, the Science Education Laboratory, and the College of Education Learning Resource Center.

COURSE DESCRIPTIONS

Note: EEd 514R and 515R are for certification purposes only and are listed in the BYU Undergraduate Catalog.

530. Principles of Learning. (3)

Improving classroom learning through understanding underlying psychological principles and theories.

533. Written Expression in the Elementary Schools. (2)

Foundation, objectives, and strategies for teaching the writing process to elementary students, including spelling, handwriting, and integration with listening and speaking skills.

620. Organization and Administration of Reading Programs. (2)

Examining ways to organize and administer school and classroom reading programs. Examining issues relating to program types, reading assessment, grouping, grade level articulation, and supervision.

632. Science in Elementary Education. (2)

Teaching elementary science; current developments and trends. Planning instructional materials and procedures for a science curriculum.

633. Trends and Issues in Literacy Education. (3)

Research, literature, and trends in listening, speaking, and writing, with their implications for instruction.

635. Mathematics in Elementary Education. (2)

Issues, research, and innovations in teaching elementary school mathematics.

636. Social Studies in Elementary Education. (2)

Domains, methods, and theories of social studies, including innovative content, e.g., law-related education, consumer education, etc.

640. Literature for Young People. (3)

Overview of (primarily) American literature of elementary school pupils; contemporary authors, trends, and classroom applications.

641. Trends and Issues in Reading. (3)

Developmental, functional, and recreational reading, with focus on research, literature, and trends in reading instruction.

642. Emergent Literacy. (2)

Needs of young readers and approaches to teaching them to read.

645. Classroom Reading**Diagnosis. (3)**

Formal and informal diagnostic procedures for classroom teachers to use in assessing and correcting reading deficiencies.

647. Comprehending Expository and Narrative Text. (2)

Comprehending and retaining text materials in different subject areas, including study and writing strategies for learning from school texts.

648R. Practicum in Reading. (1-4)

Prerequisite: EEd 645.

Diagnosing reading difficulties, designing effective teaching strategies, and evaluating effectiveness of instruction.

650. Technology in Reading and Evaluation of Reading Materials. (1-3)

Using available software and technology for reading instruction in elementary schools and a critical analysis of print and nonprint materials.

660. Historical Foundations in Reading. (2)

In-depth study of the history of reading education, books, and reading instruction with implications for present-day reading practices.

672R. Introduction to Research Design. (1-3)

Introduction to designing, conducting, analyzing, reporting, and evaluating research studies in education.

676. Research in Reading. (2)

Prerequisite: EEd 641.

Research literature in reading, both classical and current, emphasizing application of findings to educational practice.

680R. Professional Internship. (1-6)

Professional work experience in area of specialization under direction of a faculty member.

690. Master's Colloquium. (1)

Current research and educational studies by faculty and students for collegial critique and analysis.

693R. Directed Individual Study. (1-4)**695R. Independent Research. (1-6)**

Conceptualizing, designing, implementing, and evaluating a student-initiated project in a school classroom for curriculum improvement.

696R. Professional Education Project. (1-6)

Developing, observing, gathering, interpreting, and reporting data derived from a project in relation to the student's professional assignment.

699R. Master's Thesis. (1-6)

Formal report and defense of substantive research, evaluation, or curriculum project designed to make an original contribution to knowledge in the field.

734. Literacy Seminar. (2)

Significant research and publications in language arts and their implications for classroom practice.

740. Theoretical Models of Reading. (2)

In-depth study of the theoretical models of the reading process. Statistical, psychological, literary, linguistic, and motivational models analyzed and critiqued.

741. Psychology and Physiology of Reading. (2)

Physiology of the eye, ear, and brain as these relate to the reading act and potential reading disabilities; psychophysical measurement methods.

742. Teaching Reading Vocabulary and Comprehension. (2)

Theories and research studies of vocabulary acquisition and reading comprehension as they relate to effective teaching.

743. Oral Language Acquisition: Parallels in Reading and Writing Development. (2)

Developmental reading stage theories, writing development theories, and invented spelling research; how these relate to oral language acquisition.

780R. Professional Internship. (1-8)

Professional work experience in area of specialization under direction of a faculty member.

790R. Advanced Seminar. (1-3)

Significant research and publications and their implications to reading instruction.

793R. Directed Individual Study. (1-4)**795R. Independent Research. (1-6)**

Conceptualizing, designing, implementing, and evaluating student-initiated research.

799R. Dissertation. (1-12)

Formal report and defense of substantive research, evaluation, or curriculum project designed to make an original contribution to knowledge in the field.

FACULTY

BAIRD, JAMES E., *Professor*. PhD, University of Utah, 1973. Teacher Education.

BIRRELL, JAMES R., *Assistant Professor*. EdD, University of Nevada, Las Vegas, 1993. Qualitative Research; Multicultural Education.

CHILCOAT, GEORGE (SKIP), *Associate Professor*. EdD, Arizona State University, 1983. Social Studies Education.

COOK, PAUL E., *Associate Professor*. PhD, Brigham Young University, 1968. Reflective Teaching; Teacher Education.

- EARLE, RODNEY S.**, *Associate Professor*. PhD, Indiana University, 1981. Teacher Planning Processes; Instructional Design; Assessment.
- ELDRIDGE, J. LLOYD**, *Professor*. EdD, University of Utah, 1970. Reading; Language Arts; Discipline; Motivation.
- FAWSON, PARKER C.**, *Associate Professor*. EdD, Brigham Young University, 1989. Reading.
- HARDY, GARRY R.**, *Associate Professor*. EdD, University of Houston, 1977. Science Education.
- HARRIS, R. CARL**, *Professor*. PhD, Pennsylvania State University, 1971. Educational Reform; Hypermediated Case Studies.
- JACOBS, JAMES S.**, *Associate Professor*. EdD, University of Georgia, 1978. Children's Literature.
- MONROE, EULA E.**, *Professor*. EdD, Vanderbilt University, 1980. Mathematics and Reading Education; Curriculum and Instruction.
- MOORE, BLAINE H.**, *Associate Professor*. EdD, University of Northern Colorado, 1969. Student Evaluation; Student Supervision.
- MORRISON, TIM**, *Associate Professor*. PhD, University of Illinois, 1986. Reading; Language Arts.
- REUTZEL, D. RAY**, *Professor*. PhD, University of Wyoming, 1982. Reading Education; Teacher Education.
- RICHARDS, A. LEGRAND**, *Associate Professor*. PhD, Brigham Young University, 1982. Educational Philosophy and Foundations.
- TOLMAN, MARVIN N.**, *Professor*. EdD, Utah State University, 1975. Science Education.
- TUNNELL, MICHAEL O.**, *Associate Professor*. EdD, Brigham Young University, 1986. Children's Literature.
- WILCOX, BRADLEY R.**, *Assistant Professor*. PhD, University of Wyoming, 1994. Reading; Language Arts; Teacher Education.

ENGINEERING MANAGEMENT AND TECHNOLOGY MANAGEMENT

This is no longer an all-college degree. See individual engineering department descriptions for the engineering management and technology focus.

Following are descriptions of courses required to fulfill the degree.

COURSE DESCRIPTIONS

EngT 500. Technical Management Seminar. (1)

Opportunities and challenges in technical management. Interaction with engineering managers in dealing with technically trained employees.

EngT 501. Management Simulation. (1)

Use of Aerospace Environment Business Simulator (computer program) to provide time-compressed experiences in managing a company involved in research, development, and manufacturing.

Mgt 501. Managerial Accounting. (3)

Nature, objectives, and procedures of cost accounting. Topics include job costing, joint product costing, cost behavior analysis, standard costs, problems of cost allocation, and uses of cost data in decision making.

Mgt 511. Managerial Finance. (3)

Financing problems facing a business: managing working capital and long-term assets; financing capital requirements in the short and long term; techniques of financial analysis and planning; identifying and valuating cash flows; cost of capital; capital budgeting, structure, and markets; raising corporate capital.

Mgt 541. Marketing Management. (3)

Development of analytical marketing tools and techniques and their utilization in case analysis and decision making in marketing management.

Mgt 551. Organizational Behavior. (3)

Individual, group, and organizational variables that inhibit or facilitate effective organizational functioning. Topics include motivation, rewards, leadership, conflicts, decision making, structure evaluation, change, and organizational functioning, design, and control.

Mgt 561. Operations Management. (3)

Analytical methods for the management of business operations; techniques for design; operation and control of operating systems.

Mgt 562. Project Management. (3)

Continuation of Mgt 561, with particular emphasis on project planning and control.

Mgt 565. Written and Oral Communication. (2)

Organization of the writing process necessary for letters, memos, resumés, and reports, emphasizing current business practices. Oral practice includes using videotape to enhance interviewing and presentation skills: standing, sitting, and prepared and impromptu communication.

Mgt 580. Business Policy. (3)

Principles and concepts presented in finance, marketing, operations, and organizational behavior; a top management approach to problems of determining corporate strategy.

ENGLISH

Chair: Jay Fox

Graduate Coordinator: Jesse Crisler

3110 JKHB

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(801) 378-8673

THE PROGRAM OF STUDIES

The English Department, as a part of the College of Humanities, offers graduate study devoted to the development of reading, writing, and thinking abilities derived from studying and producing literary and other texts in English. Students study these works in aesthetic, historical, religious, and other contexts, including the theoretical contexts the faculty bring to the courses they teach. This program makes intensive use of the library and its resources.

The English MA program enables students to develop knowledge, skills, and attitudes that have application in contemporary society and that are in harmony with the principles of the restored gospel of Jesus Christ.

The program may appeal to students who plan to enter such careers as teaching, editing, and writing; to those who seek an advanced liberal arts degree for preparation in library science or public service; to those who plan to go on for a doctorate in English or a related area; and to those who wish to continue studies for personal satisfaction.

One degree is offered through the Department of English: English—MA.

Each year there are approximately 100 students in the English MA program. The average duration for the degree is two years.

English—MA

The MA degree in English offers course work beyond the bachelor's

degree in seven areas of emphasis: American Literature, Creative Writing, English Literature (Beginning to 1800), English Literature (1800 to Present), Language, Other Literature (Folklore and Ethnic), or Rhetoric.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: application, including writing sample.
- Entrance examination: GRE advanced literature subject test is optional.
- Prerequisite: undergraduate major or its equivalent, one course in literary criticism (Engl 351 or 352 or equivalent), one course in the history of the English language (Engl 324 or equivalent), and reading knowledge of one foreign language.

Requirements for Degree.

- Credit hours: 31 minimum, consisting of 25 course work hours plus 6 thesis hours (Engl 699R).
- Core requirement (10 hours): Engl 600 (1); Engl 610 or, with approval, a rhetoric section of Engl 521R (3); Engl 620 or, with approval, Engl 527, 528, 529, 624, or 626 (3); Engl 630 or, with approval, Engl 650R (3).
- Emphasis: 9 hours of course work in an approved area of emphasis beyond the core that will support 6 hours' work on thesis. The emphasis must constitute a coherent body of study in an area the faculty can support. Areas of emphasis are American Literature, Creative Writing, English Literature (Beginning to 1800), English Literature (1800 to Present), Folklore and Ethnic Literature, Language, Rhetoric. Courses within an emphasis are proposed by the student and approved through appropriate departmental process.
- Electives: 6 hours of approved study outside the core and area of emphasis.
- Limitation on individual readings courses: no more than 3 hours of individual readings (Engl 590R) may be applied to the minimum 25 hours of course work.

- Thesis: 6 hours of 699R on a topic demanding research and analysis; or, for those with creative writing as their approved emphasis, a substantial creative work.
- Examination: examination on thesis, related course work in emphasis, and an approved reading list related to emphasis.

FINANCIAL ASSISTANCE

Financial assistance is available for this program through the English Department and other agencies in the university. However, the English Department does not offer its own scholarships.

Admitted students are encouraged to apply for instructorships, teaching and research assistantships, editing internships, and other awards that are provided as a financial and learning resource. The university makes some money available each year for tuition awards and handles federal student loans.

RESOURCES AND OPPORTUNITIES

The Department of English utilizes the **Humanities Research Center**. This center is especially active in the production of teaching and research materials, particularly those that are computer related.

The **Center for the Study of Christian Values in Literature** was established in 1980 to affirm the importance of religious and moral values in the creation and study of imaginative literature. It provides both a focus for activity and an encouragement to teachers, writers, scholars, and readers who believe in a value-centered literary tradition.

The **Reading-Writing Center** is available to assist students and faculty in improving their reading and writing skills. Graduate students benefit particularly from critical evaluations of drafts of seminar papers and theses, and those with advanced reading and

writing skills may serve as interns in the center.

Faculty research interests are included in the faculty section following the course descriptions.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500R. Eminent American Writers. (1-3)

Different writers each semester.

510R. Eminent English Writers. (1-3)

Different writers each semester.

515R. Advanced Scholarly Writing. (3)

Workshop for potential graduate students, graduate students, and professionals in all disciplines in preparing the thesis, dissertation, book chapter, and article.

516. Advanced Technical Writing. (3)

Prerequisite: Engl 316 or instructor's consent.
Advanced concepts, including literature of technical writing, liaison with technical staff, communication networks, rhetoric of graphics, and teaching and freelancing technical writing.

518R. Advanced Creative Writing. (3)

Prerequisite: Engl 318R, 319R, or instructor's consent.
Writing fiction, poetry, drama, and the essay; individual consideration of manuscripts; professional orientation. May be repeated for credit with departmental approval.

520R. Studies in Theme and Form. (1-3)

Topics vary: literature and film, myth and archetype, science fiction, etc.

521R. Studies in Language and Rhetoric. (1-3)

Prerequisite: Engl 324.

Topics vary with instructor.

527. Early Modern English. (3)

Prerequisite: Engl 223, 324.

English language from about 1500 to 1800, with special emphasis on the language of Shakespeare and the King James Bible.

528. Varieties of English. (3)

Prerequisite: Engl 223, 324.

Regional and social variation in English, especially standard and non-standard national and world Englishes, including English-based pidgins and creoles.

529. Structure of Modern English. (3)

Prerequisite: Engl 328, Ling 325, or instructor's consent.

English syntax through modern grammars; theories underlying those grammars.

590R. Individual Readings in English. (1-3)

Prerequisite: graduate coordinator's consent.

Language and/or literature beyond what is offered in the curriculum. May not be substituted for another catalog course.

599R. Cooperative Education. (1-9)

Prerequisite: department chair's consent.

On-the-job training.

600. Introduction to Graduate Studies. (1)

Trends in postgraduate curricula, ideology, pedagogy, and professional publication in language and literature.

610. Rhetoric and Composition. (3)

Theory and methods of teaching rhetoric and composition; emphasis on rhetoric's relationship to the study of literature and language. (Required of all graduate student instructors.)

612. History of Rhetoric. (3)

Major texts, thinkers, and movements of the Western rhetorical tradition from classical antiquity to the present.

614. Theory of Rhetoric and Composition. (3)

Prerequisite: Engl 610.

Rhetorical theory and its relationship to current issues in rhetoric and composition.

616. Research in Rhetoric and Composition. (3)

Prerequisite: Engl 610.

Research methods in rhetoric and composition; evaluation of assumptions, strengths, and limitations of each method; identification of student research topics.

620. Language and Literature. (3)

Literature from a language perspective; applying linguistic constructs to literary language; examining literary style; linguistic analysis of unfamiliar texts.

624. Old English. (3)

Old English grammar and vocabulary; traditional syntactical patterns in various types of Old English prose and poetry.

625. Beowulf. (3)

Prerequisite: Engl 624.

Close reading of the poem in the original, emphasizing literary and cultural values.

626. Middle English. (3)

Detailed study of the principal dialects as illustrated in the literature of the period.

630. Theoretical Discourse. (3)

Modes of criticism: how to analyze assumptions, methods, and interpretations; how theory relates to practice; how to manage conflict among theories.

631. Studies in the English Novel. (3)

Analysis of literary values and techniques in selected novels.

635. Studies in the American Novel. (3)

Various approaches to the novel.

641. Studies in Drama. (3)

Intensive study of drama.

650R. Studies in Literary Criticism. (3)
Modern critical theory and practice applied to specific literary works.

655. Women's Textual Studies. (3)
Ways feminist critical insights affect the study of language, literature, and culture.

658R. Ethnic, Regional, and Other Literatures in English. (3)
Emphasis varies with instructor.

661. Studies in Early American Literature. (3)
Texts from times of the English settlement through the early 1800s.

662. Studies in Early Nineteenth-Century American Literature. (3)
Texts from the early 1800s through midcentury, with special attention to romanticism in America.

664. Studies in Late Nineteenth-Century American Literature. (3)
Texts from the middle through the end of the nineteenth century, with special attention to realism in America.

665. Studies in Early Twentieth-Century American Literature. (3)
Texts, trends, and writers from 1900 to midcentury.

666. Studies in Late Twentieth-Century American Literature. (3)
Texts, trends, and writers from the end of World War II to the present.

667. Studies in Folklore. (3)
Prerequisite: Engl 391 or instructor's consent.
Directed study in folklore and folkways, including Mormon heritage and tradition. Collecting, analyzing, and editing.

669R. Teaching English in the Secondary Schools. (2)
Prerequisite: Engl 377 or instructor's consent.
Literature, writing, language, and reading materials appropriate to English courses; effective use of these materials.

671. Studies in English Medieval Literature. (3)
Close reading in the original of a principal work, such as *Troilus and Cryseyde*, *Piers Plowman*, or *Sir Gawain and the Green Knight*, emphasizing its relation to other literature, culture, and history of the period.

672. Studies in English Renaissance Literature. (3)
Individual authors, styles, influences, and trends in sixteenth- and seventeenth-century English literature.

673. Studies in English Classicism. (3)
Selected writers from 1660 to 1780.

674. Studies in English Romanticism. (3)
Selected writers and trends from 1780 to 1832.

675. Studies in Victorian Literature. (3)
Literary genres, values, and techniques in representative works from 1832 to 1890.

676. Studies in Modern British Literature. (3)
Selected authors and works from 1890 to 1950.

680. Studies in Contemporary Literature. (3)
Specific trends in literature and criticism since midcentury.

682. Studies in Shakespearean Scholarship and Criticism. (3)

699R. Master's Thesis. (Arr.)

FACULTY

BALLANTYNE, VERDON W., Associate Professor. MA, Brigham Young University, 1964. American Literature; Technical Writing.

BALTES, PAUL J., Assistant Professor. PhD, Purdue University, 1995. Linguistics; Rhetoric and Composition; Humor Studies.

BEECHER, MAUREEN URSENBACH, Professor. PhD, University of Utah, 1973. Mormon Literature; Biography and Autobiography.

BENNION, JOHN S., Associate Professor. PhD, University of Houston, 1989. Creative Writing; British Novel; Mormon Literature.

BEST, BRIAN S., Associate Professor. PhD, University of Wisconsin, Madison, 1971. Nineteenth-Century British Literature; G. B. Shaw; Bible as Literature.

BEST, LORNA N., Associate Professor. MA, Brigham Young University, 1962. British Literature; Shakespeare.

BLANCH, MAE, Professor. PhD, University of Colorado, 1966. British, American, and European Novel.

BOSWELL, GRANT M., Associate Professor. PhD, University of Southern California, 1985. Rhetorical Theory and History; Composition Theory.

BURTON, GIDEON O., Assistant Professor. PhD, University of Southern California, 1994. History of Rhetoric; Renaissance Literature; Mormon Criticism and Literature.

CHAPMAN, DON E., Assistant Professor. PhD, University of Toronto, 1995. Old English Language and Literature; History of the English Language; Medieval Literature.

CHRISTIANSEN, NANCY L., Assistant Professor. PhD, University of California, Los Angeles, 1994. History and Theory of Rhetoric; Sixteenth-Century English Literature.

CLARK, GREGORY, Professor. PhD, Rensselaer Polytechnic Institute, 1985. Rhetorical Theory and Criticism; Early American Literature.

COWLES, DAVID L., Associate Professor. PhD, University of Chicago, 1985. Victorian Literature; English Novel; Literary Theory and Criticism.

CRACROFT, RICHARD H., Professor. PhD, University of Wisconsin, Madison, 1969. Nineteenth-Century American Literature; Literature of the American West.

- CRISLER, JESSE S.**, *Professor*. PhD, University of South Carolina, 1973. Nineteenth-Century American Literature; Naturalism; Adolescent Literature.
- CRONIN, GLORIA L.**, *Professor*. PhD, Brigham Young University, 1980. Twentieth-Century American Literature; Jewish American Literature; Nineteenth- and Twentieth-Century Women's Literature.
- CROWE, CHRISTOPHER E.**, *Associate Professor*. EdD, Arizona State University, 1986. English Education; Adolescent Literature.
- DUERDEN, RICHARD Y.**, *Associate Professor*. PhD, University of Chicago, 1989. Sixteenth- and Seventeenth-Century English Literature; Literary Theory.
- EGGINGTON, WILLIAM G.**, *Associate Professor*. PhD, University of Southern California, 1985. Varieties of English; Contrastive Rhetoric; Language Policy.
- ENGLAND, EUGENE**, *Professor*. PhD, Stanford University, 1974. Nineteenth-Century American Literature; Literature of the Latter-day Saints; Shakespeare.
- EVENSON, BRIAN**, *Assistant Professor*. PhD, University of Washington, 1993. Critical Theory; Eighteenth-Century Literature; Creative Writing.
- FOX, JAY**, *Professor*. PhD, Purdue University, 1971. Late Nineteenth- and Early Twentieth-Century British Literature; Literature and Film.
- GEARY, EDWARD A.**, *Professor*. PhD, Stanford University, 1971. Late Nineteenth- and Early Twentieth-Century British and American Literature; Nature Writing.
- HANSEN, KRISTINE**, *Associate Professor*. PhD, University of Texas, Austin, 1987. Rhetoric; Composition Theory.
- HARRIS, CLAUDIA W.**, *Associate Professor*. PhD, Emory University, 1990. Irish Literature; Modern and Contemporary Drama; Contemporary British Literature.
- HATCH, GARY L.**, *Assistant Professor*. PhD, Arizona State University, 1992. History and Theory of Rhetoric; Eighteenth-Century English Literature.
- HOUSTON, GAIL T.**, *Assistant Professor*. PhD, University of California, Los Angeles, 1990. Women's Studies; Cultural Studies.
- HOWE, SUSAN**, *Associate Professor*. PhD, University of Denver, 1989. Creative Writing; Contemporary American Poetry and Drama.
- HUNSAKER, O. GLADE**, *Associate Professor*. PhD, University of Illinois, 1970. Seventeenth-Century British Literature; Milton; Shakespeare.
- JOHSTONEAUX, RAPHAEL**, *Associate Professor*. PhD, George Peabody College for Teachers of Vanderbilt University, 1980. Modern American Literature; English Education.
- JORGENSEN, B. W.**, *Associate Professor*. PhD, Cornell University, 1978. Creative Writing; Nineteenth-Century American Literature; Contemporary American Fiction.
- LAMBERT, NEAL E.**, *Professor*. PhD, University of Utah, 1966. American Literature 1620-1860.
- LARSEN, LANCE E.**, *Assistant Professor*. PhD, University of Houston, 1993. Creative Writing; American Literature.
- LAWRENCE, A. KEITH**, *Assistant Professor*. PhD, University of Southern California, 1987. Early American Literature; Asian-American Literature.
- LOFGREEN, CHARLOTTE D.**, *Assistant Professor*. MA, Brigham Young University, 1973. Composition; English Education; American Literature.
- LUNDQUIST, SUZANNE E.**, *Associate Professor*. DA, University of Michigan, 1985. Native American Sacred Texts and Modern Novels; Third World Literature.
- MUHLESTEIN, DANIEL K.**, *Assistant Professor*. PhD, Rice University, 1992. Literary Theory; English Romantic Literature.
- MURPHY, JOHN J.**, *Professor*. MA, St. John's University, 1961. Nineteenth- and Early Twentieth-Century American Literature; Willa Cather.
- NELSON, JOYCE**, *Associate Professor*. MS, Florida State University, 1971. English Education; Critical Reading.
- NORRIS, G. LESLIE**, *Humanities Professor of Creative Writing*. MPhil, Southampton University, England, 1958. Creative Writing; English Romantic Literature.
- NORTON, DON E.**, *Assistant Professor*. MA, Brigham Young University, 1961. English Language; Usage.
- OAKS, DALLIN D.**, *Assistant Professor*. PhD, Purdue University, 1990. English Linguistics; Structure of English; Old English Language.
- PARRY, CATHERINE CORMAN**, *Associate Professor*. PhD, University of California, Los Angeles, 1985. Medieval English Language and Literature.
- PAXMAN, DAVID B.**, *Associate Professor*. PhD, University of Chicago, 1982. Eighteenth-Century English Literature; Intellectual History.
- PEDERSEN, ELRAY L.**, *Associate Professor*. PhD, University of Minnesota, 1977. English Education; Teaching of Writing.
- PLUMMER, LOUISE R.**, *Assistant Professor*. MA, University of Minnesota, 1984. Creative Writing.
- RIGBY, W. DEAN**, *Assistant Professor*. MA, Brigham Young University, 1970. Composition.
- SIEGFRIED, BRANDIE R.**, *Assistant Professor*. PhD, Brandeis University, 1993. Sixteenth- and Seventeenth-Century English Literature; Women's Studies; Literary Theory.
- SKOUSEN, ROYAL**, *Professor*. PhD, University of Illinois, 1972. Linguistics; Textual Criticism.
- SMITH, MARION K.**, *Associate Professor*. PhD, University of Texas, 1986. Technical Writing; American Literature; Science Fiction.
- SNYDER, PHILLIP A.**, *Associate Professor*. PhD, University of North Carolina, Chapel Hill, 1988. Twentieth-Century British and American Literature; Autobiography.

SORENSEN, PETER J., *Assistant Professor*. PhD, Washington State University, 1988. English Romantic Literature.

SPENCER, DARRELL K., *Associate Professor*. PhD, University of Utah, 1986. Creative Writing; American Novel.

TANNER, JOHN S., *Professor*. PhD, University of California, Berkeley, 1980. Milton; Seventeenth-Century English Literature.

TANNER, STEPHEN L., *Professor*. PhD, University of Wisconsin, Madison, 1969. American Literature; Literary Criticism.

TAYLOR, SALLY T., *Professor*. PhD, University of Utah, 1975. Technical Writing; Creative Writing.

THAYER, DOUGLAS H., *Professor*. MFA, University of Iowa, 1962. Creative Writing.

THOMAS, PAUL R., *Associate Professor*. DPhil, University of York, England, 1982. Chaucer, Middle English Language and Literature; English Renaissance Literature.

WAHLQUIST, ELIZABETH, *Associate Professor*. MA, MLitt, Middlebury College, 1962, 1971. Modern American Literature; Adolescent Literature; Robert Frost.

WALKER, STEVEN C., *University Alumni Professor*. PhD, Harvard University, 1973. Victorian Literature; Bible as Literature.

WILLIAMS, RAY S., *Associate Professor*. PhD, Florida State University, 1965. Colonial and Nineteenth-Century American Literature.

WILSON, WILLIAM A., *Humanities Professor of Literature and Folklore*. PhD, Indiana University, 1974. Folklore and Mythology; American Studies.

YOUNG, BRUCE W., *Associate Professor*. PhD, Harvard University, 1983. English Renaissance Literature; Shakespeare.

ZIMMERMAN, BEVERLY B., *Assistant Professor*. PhD, Brigham Young University, 1994. Technical Communication; Computers and Composition.

FAMILY SCIENCES

Chair: James M. Harper
Graduate Coordinator: Jeffrey H. Larson

240 TLRB
PO Box 25525
Provo, UT 84602-5525
(801) 378-6508

THE PROGRAM OF STUDIES

The goal of the department is to provide quality education in prevention and intervention that promotes quality family living across generations. The department is noted for contributions in theory, philosophy, and practice in home and family life education, optimal human development, and marriage and family therapy.

Faculty research interests focus on intergenerational relationships and programs that strengthen marriages and families.

Five degrees are offered through the Department of Family Sciences: Family Sciences—MS; Family Sciences—PhD; Marriage and Family Therapy—MS; Marriage and Family Therapy—PhD; Family Studies—PhD (furloughed).

The average number of students admitted into the Family Science Department's programs and the duration of each degree are as follows: Family Sciences—MS, four to six students per year in a two-year program; Family Sciences—PhD, four students per year in a three- to four-year program; Marriage and Family Therapy—MS, seven students per year in a two-year program; Marriage and Family Therapy—PhD, six students per year in a three- to four-year program.

Family Sciences—MS

The MS degree in family sciences provides the student with a comprehensive, broad-based understanding in human development and/or family

science. Four subject areas are available to the student according to his or her professional goals: family life education, family resource management, human development, and home economics education. The home economics education program accommodates part-time as well as full-time students.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: at least three letters of recommendation are required, two of which must be from academic faculty or others qualified to assess academic qualifications, and GRE general test.
- Prerequisite:
Family Sciences: FamSc 310, 460, and other courses as required by graduate committee.
Home Economics: Stat 552 or equivalent and other courses as required by graduate committee.
Human Development: FamSc 300, 310, 322 (for those pursuing an ECE certificate), Intro to SPSS or SAS.

Requirements for Degree.

- Credit hours:
Family Sciences (36): minimum 30 course work hours plus 6 thesis hours (FamSc 699R).
Home Economics Education (30): minimum 24 course work hours plus 6 thesis hours (FamSc 699R).
- Required courses:
Family Life Education: FamSc 514, 560, 563, 564, 565, 600, 699R (6 hours minimum) 792R (1 hour).
Family Resource Management: FamSc 460, 540, 545, 560, 563, 564, 570, 600, 699R (6 hours minimum), 792R (1 hour); Stat 554.
Home Economics Education: for instructional or curricular emphasis: FamSc 563, 564, 565, 600, 676, 689, 792R (1 hour), Stat 554, FamSc 699R; for international emphasis, FamSc 563, 564, 565, 600, 662, 678, 689, Stat 554, FamSc 699R, 792R (1 hour).
Human Development: FamSc 514, 560, 563, 564, 600, 699R (6 hours minimum); Stat 501; FamSc 792R (1 hour).

- Required specialty courses for those pursuing ECE certificate (15 hours): FamSc 520, 522, 622R (2 hours); administration/supervision in ECE program, FamSc 622R (2 hours); advanced practicum, FamSc 623, 642.
- Electives:
Family Life Education: 11 hours determined in consultation with graduate committee.
Family Resource Management: 2–3 hours from FamSc 501R, 595R, 601, 675, 689; or courses approved by graduate committee.
Home Economics Education: as determined in consultation with graduate committee (FamSc 530 recommended).
Human Development: as determined in consultation with graduate committee.
- Minor: any minor approved by graduate committee, but none is required.
- Thesis.
- Examination: oral defense of thesis.

Marriage and Family Therapy—MS

The department offers the master of science degree as a two-year program. The objective of this degree is to train persons who will be outstanding clinicians, prepared to function in a wide variety of marriage and family therapy settings. The curriculum is based on state licensure/certification requirements and is accredited by the Commission on Accreditation of the American Association for Marriage and Family Therapy. The master's degree is the basic credential for independent practice in marriage and family therapy.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination is GRE general test.
- Recommended: background in research, e.g., research methodology and statistics (5 hours); behavioral sciences, e.g., personality, child development, abnormal psychology, learning theory (9 hours); social

sciences, e.g., family living, social psychology, sociology (6 hours).

Requirements for Degree.

- Credit hours (62): minimum 56 course work hours plus 6 thesis hours (699R).
- Required courses: FamSc 555R (6 hours), 563, 564, 600, 640, 645, 650, 651, 652, 653, 654, 655R (10 hours), 656, 699R (6 hours) 792R (1 hour); Stat 501 or Psych 501; electives (3 hours).
- Clinical requirement: 500 hours of direct client experience.
- Thesis.
- Examination: oral defense of thesis.

Family Sciences—PhD

The PhD in family sciences teaches a familial approach to understanding behavior. Systems theory is a hallmark of our theoretical focus, as are all developmental theories. Understanding the philosophy of social science is also a thrust. The core required classes total 15 hours plus dissertation. Students must then select additional course work in human development, family relationships, research, statistics, and computer skills to complete their program. Each student's program must be approved by a faculty committee chosen by the student. A PhD in family sciences prepares students for teaching in research positions in family and human development departments.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination is GRE general test.
- Prerequisite: master's degree in family sciences or equivalent. For Human development specialty candidates: master's degree in human development or equivalent; direct admission with a BS or BA degree is possible, but outlined course work would be integrated into doctoral program.

Requirements for Degree.

- Credit hours (72 plus skill): minimum 54 course work hours plus 18 dissertation hours, plus skill requirement.
- Required courses: determined in consultation with graduate committee.
- Minor: any minor approved by graduate committee, but none is required.
- Skill requirement: consult department for details.
- Dissertation: 18 hours minimum.
- Examinations: (A) written comprehensive examination; (B) oral defense of dissertation.

For detailed information consult the department's Human Development Area coordinator.

Marriage and Family Therapy—PhD

The program is accredited by the Commission on Accreditation for Marriage and Family Therapy Education of the American Association for Marriage and Family Therapy and has three interrelated emphases—Clinical Practice, Teaching/Supervision, and Research.

There are two options for the PhD degree in marriage and family therapy. The first, for students who already have a master's degree, should take approximately three years to complete. The second is for the post-baccalaureate student and should take approximately four years to complete. The master's curriculum is followed during the first two years, with the MS degree awarded at the completion of those requirements.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination is GRE general test.
- Recommended:
Post-Master's Degree Option: master's degree from a regionally accredited college or university.
 (Applicants without a marriage and

family therapy master's degree may need to complete prerequisite course work.)

Postbaccalaureate Degree Option:

baccalaureate degree from a regionally accredited college or university; background in research, e.g., research methodology and statistics (5 hours); behavioral sciences, e.g., child development, abnormal psychology, learning theory (9 hours); social sciences, e.g., family sciences, psychology, social psychology, sociology (6 hours).

Requirements for Degree.

- Credit hours (80 plus skill beyond baccalaureate; 48 plus skill beyond master's): minimum 62 course work hours beyond the baccalaureate or 30 course work hours beyond the master's, plus 18 dissertation hours (FamSc 799R), plus skill hours.
- Required courses: determined in consultation with graduate committee.
- Minor: any minor approved by graduate committee, but none is required.
- Skill requirement: consult department.
- Clinical requirement: 500 hours of direct client experience.
- Dissertation.
- Examinations: (A) written and oral comprehensive examinations in clinical practice, teaching/supervision, and research; (B) oral defense of dissertation.

Family Studies—PhD

(Interdepartmental)

This program has been furloughed. For information regarding the program, contact the dean of the College of Family, Home, and Social Sciences, 990 SWKT, PO Box 25535, Provo, UT 84602-5535, telephone (801) 378-2083.

FINANCIAL ASSISTANCE

The department offers graduate research and teaching assistantships, supplementary awards and scholarships, and internships as aid. Once admitted to the program, the student

will receive by mail a department application for financial assistance.

RESOURCES AND OPPORTUNITIES

The Center for Studies of the Family.

This center is an interdisciplinary research center focusing on studies related to all aspects of the family. The institute encourages and supports research on family-related topics ranging from prenatal development to problems of aging. Many of the faculty in the college are actively engaged in such research and are fellows of the center. Activities include weekly symposia for sharing and evaluating the findings of faculty and graduate research, publication of a multidisciplinary journal of family life, and an annual research conference.

The Comprehensive Clinic. The Comprehensive Clinic at Brigham Young University is a unique interdisciplinary training and research facility housing the finest video and computer facilities available and a staff of skilled technicians and secretaries to support graduate student and faculty research. The clinic currently functions as a training facility for an AAMFT-approved marriage and family therapy PhD and for MS training programs. In addition, the clinic provides the university and the broader geographical community with mental health services involving between 200 and 250 clients each week.

Family, Home, and Social Sciences Computing Center. The center assists faculty and students with social science data processing and other computing needs on mainframe and personal computers. Technical support and consultation services for both statistics and graphics are available to students working on research projects, theses, and dissertations.

Family Sciences Laboratories. These excellent facilities provide a practicum setting in which graduate students develop skills in conducting and interpreting research involving small children.

Joseph Fielding Smith Institute for Church History. The institute's purpose is to study the Latter-day Saint past. Its personnel are historians whose primary work is writing and publishing for professional and general Church audiences. The institute also seeks to facilitate the research of other Church history scholars by providing limited support for research and publication.

Women's Research Institute. Initially established in 1978, the Women's Research Institute became a part of the College of Family, Home, and Social Sciences in September 1983. Since then the institute has awarded fellowships to upper-division and graduate students for conducting research on women and women's issues in amounts up to \$500 annually for selected projects. Faculty grants became available through the institute in 1984.

The college also provides additional research and academic support to family science programs through the Camilla Eyring Kimball Chair of Home and Family Life.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

501R. Workshop in Family Sciences. (1-2)

Prerequisite: 8 hours in family sciences or department chair's consent.

Intensive study in applying principles of the following: specified family sciences, subject matter in early childhood education, child development, family relationships, family resource management, or marriage/family therapy.

510. Seminar in Intellectual Development. (3)

Prerequisite: FamSc 514.

Current theories and research on intellectual development.

511. Familial Influences on Social Development. (3)

Prerequisite: FamSc 310 or equivalent.

Current theories and research on social development, peer relations, and behavior. Familial/parenting effects as moderated by beliefs, genetics, gender, social cognitions, culture, child guidance, interventions.

512. Emotional and Moral Development. (3)

Prerequisite: instructor's consent.

Research, theories, and educational implications; preschool through adulthood.

514. Theories of Human Development. (3)

Prerequisite: FamSc 310 or equivalent.

Models and concepts in dominant contemporary developmental theories.

520. Head Teachers Practicum in Preschool. (4)

Prerequisite: FamSc 322, 323, or equivalent.

Head teaching proficiencies: guiding teachers of young children, techniques for involving parents, evaluating student teachers, assessing child performance, reviewing child guidance, and developing curriculum.

522R. Seminar in Early Childhood Education. (2)

Prerequisite: FamSc 322 or equivalent.

Teacher skills: developing, applying, measuring, and evaluating effective techniques. Curriculum: selecting, organizing, and creating curriculum materials for young children.

540. Family Economics. (3)

Economic functioning of household; role of income, employment, and household production as determinants of family living level.

545. Family Financial Resource Management. (3)

Prerequisite: FamSc 304 or equivalent.

Applying theories and principles in managing financial resources to meet needs of individuals and families.

550. (FamSc-Soc) History and Development of Theory About the Family. (3)

Prerequisite: FamSc 250, Soc 311, or equivalent.

Historical/intellectual roots of theorizing about families; paradigms and assumptions underlying theorizing; contemporary research and theory interface.

551. Fathering: Scholarship and Intervention. (3)

Prerequisite: instructor's consent.

Quality fathering across cultures and in varied family circumstances. Historical changes in fathering; challenges to good fathering; effective interventions with fathers.

555R. Beginning Practicum in Marriage and Family Therapy. (2-3)

Prerequisite: FamSc 650 and instructor's consent.

Introduction to clinical methods and experience in counseling individuals, premarital and marital dyads, and families. For marriage and family therapy majors only.

560. Perspectives on Familial Processes. (3)

Prerequisite: instructor's consent.

Integration of theories used for understanding and strengthening families. Research and application on family processes.

561. Seminar in Family Law. (3)

Prerequisite: concurrent registration in FamSc 461.

Intensive investigation of issues and concepts influencing legal aspects of marriage and family life.

562. Seminar in Professional Responsibility. (3)

Ethical issues and legal responsibility in professional practice.

563. Theoretical Foundations of Family Systems. (3)

Systems theory and cybernetic approaches to family processes and epistemological issues.

564. Human and Family Development Over the Life Cycle. (3)

Interrelationships between individuals and family life cycle development, including modifying family processes and structure over time.

565. Instructional Processes in Family Sciences. (3)

Methods and curriculum of design, development, implementation, management, and evaluation related to family sciences and home economics curricula.

566. Preparation for Teaching Practicum. (1)

Prerequisite: instructor's consent.

Developing curriculum in preparation for teaching an undergraduate course in family sciences. Approval of curriculum required before enrolling in FamSc 567R.

567R. Practicum in Family Life Education. (1-3)

Prerequisite: FamSc 565, 566, or instructor's consent.

Supervised experience teaching family living courses in a university setting.

570. Paradigms in Family Process and Analysis. (3)

Prerequisite: FamSc 371 or equivalent.

Alternative perspectives on family management, governance, and participation, with emphasis on modernist/management vs. familial orientation affecting leadership, parenting, autonomy and choice, altruism, and individualism.

590R. Readings in Family Sciences. (1-2)

Prerequisite: FamSc 310 or 460; instructor's consent.

Discussions and reports of current readings.

595R. Special Topics in Family Sciences. (1-2)

Prerequisite: for family sciences major—FamSc 310 or 460; instructor's consent.

Individual study for qualified students.

600. (FamSc-Soc) Advanced Research Methods. (3)

Prerequisite: Soc 300 or instructor's consent.

Training in survey, experimental, secondary analysis, content analysis, qualitative, evaluation, and environmental impact research techniques.

601. (FamSc-Soc) Seminar in Survey Research. (3)

Prerequisite: Soc 300 or equivalent.

Survey research techniques of the behavioral sciences, emphasizing research and sampling designs.

602. (FamSc-Soc) Experimental Design. (3)

Prerequisite: FamSc-Soc 600, Stat 501 or equivalent, or instructor's consent.

Research methods, logic, writing, and data analysis.

603R. (FamSc-Soc) Research Practicum. (3)

Prerequisite: instructor's consent.

Design, data collection, data analysis, and write-up.

604. (FamSc-Soc) Ethnographic Research Techniques. (3)

Prerequisite: FamSc-Soc 600 or equivalent.

Rationale, methods, and limitations of qualitative research; includes participant observation and hermeneutic skills.

623. History, Theories, and Research in Early Childhood Education. (3)

Prerequisite: instructor's consent.

History, research, philosophies, and models of early childhood education. Current issues and innovations.

640. Clinical Specialization in Marriage and Family Therapy. (3)

Current research on family therapy-based treatment of specific clinical problems. For marriage and family therapy majors only.

645. Analysis and Treatment of Human Sexual Development. (3)

Prerequisite: FamSc 650.

Knowledge and skill required to analyze and treat questions related to human sexual development.

650. Theoretical Foundations of Marital and Family Therapy. (3)

Epistemological and theoretical issues in marital and family therapy, including normal family processes and personal and intergenerational family issues.

651. Psychopathology and Assessment in Marriage and Family Therapy. (3)

Interpreting and assessing mental disorders and dysfunctional relationships. Etiology and diagnosis of individual, marital, and family psychopathology.

652. Marital and Individual Psychotherapy. (3)

Assessment, intervention techniques, therapist's role, and principle processes in theories of systemic individual and marital psychotherapy. For marriage and family therapy majors only.

653. Family and Multigenerational Psychotherapy. (3)

Systemic theories and strategies to diagnose and treat specific problems in dysfunctional families. For marriage and family therapy majors only.

654. Issues of Gender and Ethnicity. (3)

Gender, ethnic, and minority issues in family systems, society, and clinical practice as they relate to individual, marital, and family treatment.

655R. Intermediate Practicum in Marriage and Family Therapy. (2-3)

Prerequisite: FamSc 555R, 650, or equivalent.

Experience in counseling individuals, premarital and marital dyads, families, groups of dyads, and multiple families. For marriage and family therapy majors only.

656. Ethical, Legal, and Professional Issues for Family Therapists. (3)

For marriage and family therapy majors only.

660. (FamSc-Soc) Child and Adolescent Socialization. (3)

Child and adolescent development in the context of social interaction, with particular emphasis on the family. Current theory and research evaluated.

662. Human Ecology in Developing Countries. (3)

Interdisciplinary seminar on problems common to families in Third World countries and current approaches to basic needs.

663. (FamSc-Soc 565) The Individual and Family in Later Years. (3)

Developmental aspects of aging, focusing on the biophysical, cognitive, social, affective, and pathological dimensions in people aged fifty and over.

665. Philosophy in Family Life Education. (3)

Prerequisite: FamSc 310, 460, or instructor's consent.

Interpretive framework in human science that addresses quality of life in families.

692R. (FamSc-Soc) Seminar in Family Relationships. (1-3)

Premarital dyad, marital dyad, and issues in family interaction and familial roles.

693R. Independent Readings. (1-3)**699R. Master's Thesis. (6-9)****750R. Supervising Marriage and Family Therapy. (2)**

Spring term focuses on theory, research, and practice of supervising marriage and family therapists. Summer term includes supervised experience. For doctoral marriage and family therapy majors only.

751. Advanced Theory in Marriage and Family Therapy. (3)

Advanced family therapy approaches to the diagnosis and treatment of affective, behavioral, and cognitive disorders. For doctoral marriage and family therapy majors only.

752. Addictions and Family Violence. (3)

Assessment and treatment of multiple-problem family systems, emphasizing addictions and abuse. For doctoral marriage and family therapy majors only.

753. Advanced Clinical Specialization in Marriage and Family Therapy. (3)

Advanced approaches in treating dysfunctional individual, marital, and family systems. For doctoral marriage and family therapy majors only.

755R. Advanced Practicum in Marriage and Family Therapy. (2-3)
Prerequisite: FamSc 650, 655R, or equivalent.

For doctoral marriage and family therapy majors only.

770R. Clinical Internship. (1)

Full-time family therapy training and practice at an approved agency.

791R. Seminar in Human Development. (1-2)

Prerequisite: must be a PhD candidate in human development.

792R.(FamSc-Soc) Family Symposium. (0.5)

Presentation and discussion of professional papers about the family.

793R. Research Seminar in Marriage and Family Therapy. (1-3)

Integrating and applying research design and statistics to the study of marital and family therapy. For doctoral majors in marriage and family therapy only.

794R. Special Topics in Child Development. (1-2)

799R. Doctoral Dissertation. (1-9)

FACULTY

BAHR, KATHLEEN S., Associate Professor. PhD, Michigan State University, 1982. Family Ecology; Home Management and Family Relationships.

BEUTLER, IVAN F., Associate Professor. PhD, Purdue University, 1974. Resource Management and Economy.

BRASHER, RUTH E., Professor. PhD, Utah State University, 1969. Family and Social Systems; Theoretical Foundations of Home Economics; Adult Education.

BURR, WESLEY R., Professor. PhD, University of Minnesota, Minneapolis, 1967. Building, Testing, and Applying Family Sciences Theories.

CRANE, D. RUSSELL, Professor. PhD, Brigham Young University, 1979. Marriage and Family Therapy.

DOLLAHITE, DAVID C., Assistant Professor. PhD, University of Minnesota, 1988. Nurturing Fathering through Transformative Scholarship.

DRAPER, THOMAS W., Associate Professor. PhD, Emory University, 1976. Early Childhood Education/Human Development.

FEINAUER, LESLIE L., Professor. PhD, Brigham Young University, 1981. Family Violence; Aging Families.

GALBRAITH, RICHARD C., Professor. PhD, Northwestern University, 1975. Human Development; Children's Memory and Intelligence.

GARRISON, CAROLYN, Assistant Professor. PhD, Purdue University, 1978. Household Equipment and Housing.

HARPER, JAMES M., Professor. PhD, University of Minnesota, Minneapolis, 1979. Family Interaction; Sibling Relationships; Aging Couples.

HART, CRAIG H., Associate Professor. PhD, Purdue University, 1987. Human Development and Early Childhood Education.

HAWKINS, ALAN J., Assistant Professor. PhD, Pennsylvania State University, 1990. Fathering; Adult Development; Division of Family Work.

HOLMAN, THOMAS B., Associate Professor. PhD, Brigham Young University, 1981. Mate Selection; Qualitative Methodology and Research.

KLEIN, SHIRLEY R., Assistant Professor. PhD, University of Utah, 1990. Family Life Education; Family Work; Prisons.

LARSEN, JEAN M., Professor. PhD, University of Utah, 1972. Teacher Training and Research in Early Childhood.

LARSON, JEFFREY H., Professor. PhD, Texas Tech University, 1980. Marriage and Family Therapy; Family Life Education.

LIND, CHARLENE, Associate Professor. PhD, University of Wisconsin, 1974. Social/Psychological Aspects of Clothing.

McKEE, TREVOR R., Associate Professor. PhD, Brigham Young University, 1973. Language Development; Duoligual Education; Theories.

MEAD, D. EUGENE, Professor. EdD, University of Oregon, 1967. Marriage and Family Therapy.

OLSEN, SUSANNE FROST, Assistant Professor. PhD, University of Georgia, 1992. Parent-Child Relationships Across the Life Course.

OLSON, TERRANCE D., Professor. PhD, Florida State University, 1972. Philosophy of Family Science; Family Life Education.

PEERY, J. CRAIG, Professor. PhD, Columbia University, 1973. Human Development; Personality and Social Development.

PODUSKA, BERNARD E., Associate Professor. PhD, Brigham Young University, 1983. Family Financial Management and Relationships.

PRICE, ALVIN H., Professor. PhD, University of Minnesota, 1963. Child Psychology.

ROBINSON, CLYDE C., Associate Professor. PhD, University of North Carolina, Greensboro, 1982. Human Development/Early Childhood Education.

ROWLEY, MAXINE R., Associate Professor. PhD, Brigham Young University, 1989. Home Economics.

STAHMANN, ROBERT F., Professor. PhD, University of Utah, 1967. Premarital, Marital Counseling Education.

WATSON, WENDY L., Associate Professor. PhD, University of Calgary, 1984. Family Therapy; Gerontology.

FOOD SCIENCE AND NUTRITION

Chair: Mark J. Rowe

Graduate Coordinator: Lynn V. Ogden

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THE PROGRAM OF STUDIES

The Food Science and Nutrition Department provides courses of learning where a commitment to excellence is expected and the realization of human potential is pursued.

The department's disciplines, activities, and instruction make a significant contribution to the balanced development of each student. Students receive excellent preparation, with opportunities to develop clear thinking, effective written and oral communication, and intellectual integrity. In this atmosphere they come to understand important concepts in their discipline through both didactic and applied experience.

The graduate programs offered in the Department of Food Science and Nutrition seek to develop students' abilities to use scientific thought processes. Students are encouraged by precept and example to be firmly founded in the discipline as well as to adhere to moral and ethical standards in their work and their personal lives.

The Department of Food Science and Nutrition offers two degrees: Food Science—MS and Nutrition—MS.

The average number of students in the Food Science and Nutrition graduate programs is fifteen, with the usual completion time being two years.

Food Science, Nutrition—MS

The food science program is designed to prepare students to work at an

advanced level in food industry or to enter graduate programs and seek doctoral degrees. This is accomplished by in-depth study of the chemistry of food component functionality, the microbiology of product manufacture and preservation, and the physical principals involved in processes. Students will be proficient at designing studies, carrying them out, and communicating the result in a manner consistent with the best professionalism in the discipline.

The MS in nutrition program prepares students for further professional study in medicine or other health sciences; for PhD work in most biological sciences, including nutrition; or to enter government health agency or food industry work at an advanced level. Graduates will be conversant with the principles of biochemistry and physiology of nutrient functions in humans or with principles of nutrition education and international nutrition aspects of human development. They will be able to use scientific principles and processes to solve current health problems related to nutrient intake in both developed and developing countries.

Admission and Entry

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international); winter, June 30 (U.S. and international).
- Entrance examination: GRE general test.
- Prerequisite: for either food science or nutrition, an undergraduate major in food science, nutrition, dietetics, or a closely related field. For molecular biology, an undergraduate major in molecular biology in nutrition or food science or equivalent.
- For molecular biology in nutrition or food science, application should be made to the molecular biology program (p. 185), designating nutrition or food science as the specialization of study.

Requirements for Degree

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (FSN 699R).
- Required courses:
Food Science Program: FSN 652, 654, 656, 691R, Zool 503, Chem 481.
Nutrition Program: FSN 531, 532, 631R, 691R; Zool 503 or Soc 600.
Molecular Biology in Nutrition or Food Science: preceding courses in food science or nutrition plus Chem 582, 586; Stat 501 or 337; Mcbio 425; Mcbio 642 or Zool 526.
- Minor (optional): selected with approval of faculty advisor.
- Thesis: standard university thesis format or journal publication format.
- Examination: (A) oral examination on course work; (B) defense of thesis.

FINANCIAL ASSISTANCE

Limited financial support is available from various sources, including scholarships and research and teaching assistantships. Second-year graduate students have priority on research assistantships. Funds are only occasionally committed to entering graduate students. To apply for teaching and research assistantships or for more detailed information, contact the department.

RESOURCES AND OPPORTUNITIES

Western Dairy Foods Research Center. Under a five-year agreement, Brigham Young University is affiliated with Utah State University and Oregon State University in the Western Dairy Foods Research Center. As one of six such centers nationwide, it is dedicated to researching cheese and other cultured products.

Dairy Products Laboratory. Researchers in the Dairy Products Laboratory conduct research dealing with milk and dairy products, using full- and pilot-scale equipment.

Sensory Laboratory. The sensory laboratory is a modern taste panel facility used to train students in sensory testing. Panelists register impressions of

samples on computerized questionnaires in an isolated booth equipped with aroma and lighting control. Computerized analysis rapidly transforms data into easily interpreted results.

Benson Quality Assurance Lab. The Benson Quality Assurance Laboratory does quality assurance testing for the LDS Church Welfare Services. This research grant provides on-the-job-training, practical experience, and the ability to receive compensation for the time spent in learning.

Faculty and graduate students are currently engaged in a number of significant and interesting research projects, funded both internally and externally. Some of these are: food process development; clinical laboratory methods; effect of nutrient intake on gene expression.

For a more detailed description of the graduate program requirements, send for a copy of the department's graduate student handbook.

COURSE DESCRIPTIONS

501R. (AgHrt-AnSc-FSN) Village Agriculture and Nutrition in Latin America. (1)

Prerequisite: experience in Latin America and/or in issues relative to the seminar.

Problems, successes, failures, and challenges facing those who work in agricultural research, training, and development related to small-scale farmers.

531. Advanced Human Nutrition 1. (3)

Prerequisite: FSN 435 or equivalent.

Nutritional status and basis of recommendations for carbohydrates, lipids, protein, and energy.

532. Advanced Human Nutrition 2. (3)

Prerequisite: FSN 435 or equivalent.

Nutritional status and basis of recommendations for vitamins, minerals, and water.

631R. Selected Topics in Food Science and Nutrition. (1-3)

Prerequisite: FSN 531, 532, or instructor's consent.

Subjects that may be offered include:

- Current Controversies
- Diabetes
- Diet and Cancer
- Diet and Cardiovascular Disease
- Eating Disorders
- Food Additives
- Gerontology
- Minerals
- Nutrition Education
- Nutrition During Pregnancy and Infancy
- Obesity and Weight Control
- Protein
- Sports Nutrition
- Vitamins

638. Advanced Clinical Nutrition. (4)

Prerequisite: FSN 300, 356, 531, 532.

Theory, techniques, and practices.

639. Advanced Public Health Nutrition. (3)

Prerequisite: FSN 400, 531, 532.

Program planning, management, and evaluation.

652. Carbohydrates and Their Reactions in Foods. (3)

Prerequisite: FSN 450 or equivalent.

Sugars, higher saccharides, starches, pectins, gums, hemicelluloses, celluloses, and their derivatives and their functions and reactions in foods.

654. Proteins and Their Reactions in Foods. (3)

Prerequisite: FSN 450 or equivalent.

Plant and animal proteins and their functions and changes during food processing; food enzyme properties.

656. Food Lipids and Their Reactions in Foods. (3)

Prerequisite: FSN 450 or equivalent.

Lipids and their reactions in foods with other components of the food system and/or the surrounding environment; lipid-processing techniques.

691R. Graduate Seminar. (1-2)

697R. Research. (1-3)

699R. Master's Thesis. (1-9).

FACULTY

BROWN, LORA BETH., *Associate Professor*. EdD, Brigham Young University, 1982. Point-of-Choice Nutritional Education.

CHRISTENSEN, MERRILL J., *Associate Professor*. PhD, Massachusetts Institute of Technology, 1982. Selenium Metabolism; Molecular Biology.

FRANZ, KAY B., *Associate Professor*. PhD, University of California, Berkeley, 1978. Human Nutrition; Mineral Absorption; Metabolism.

HILL, JOHN M., *Professor*. PhD, Rice University, 1965. Nutritional Biochemistry; International Nutrition.

HUBER, CLAYTON S., *Dean, Professor*. PhD, Purdue University, 1968. Food Chemistry; Food Preservation; Food Processing.

NYLAND, NORA K., *Assistant Professor*. PhD, Kansas State University, 1989. Dietetics; Institutional Management.

OGDEN, LYNN V., *Associate Professor*. PhD, University of Minnesota, St. Paul, 1973. Food Chemistry; Dairy Products; Food Processing; Sensory Analysis.

PIKE, OSCAR A., *Associate Professor*. PhD, Purdue University, 1986. Food Chemistry; Lipid Oxidation; Food Processing and Storage.

ROWE, MARK J., *Professor*. PhD, Brigham Young University, 1972. Molecular Biology; Mitochondrial Gene Expression.

STEELE, FROST M., *Assistant Professor*. PhD, Purdue University, 1990. Food Microbiology; Molecular Biology.

WOOLLEY, BRUCE H., *Professor*. PharmD, University of Southern California, 1972. Pharmacology.

FRENCH AND ITALIAN

Chair: Madison U. Sowell

Graduate Coordinator: Mark E. Bell

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THE PROGRAM OF STUDIES

The programs in French are designed to assist students seeking careers in foreign language education, international business or law, or the foreign service. The degree can also serve as a step toward doctoral studies.

One degree is offered through the Department of French and Italian: French Studies—MA. An additional MA in language acquisition (French) is offered as part of the College of Humanities' program in language acquisition.

The average number of students admitted to the programs is from four to five per year. Most students require four semesters to complete the degree.

French Studies—MA

The departmental MA is both versatile and flexible. To complete the degree in one year, students must take four graduate courses in French (two per semester) and four in such approved areas as comparative literature, humanities, linguistics, and Romance philology; the thesis, which may consist of three long papers, must be written in the spring and summer terms. Alternatively, students may take exclusively French courses (two per semester) over four semesters and then prepare the writing project.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and April 1 (U.S.); winter, June 30 (international) and September 1 (U.S.)

- Application requirements: entrance examination is GRE general test.
- Prerequisite: baccalaureate degree in French or equivalent; advanced French language proficiency based on American Council on Teaching of Foreign Languages (ACTFL) rating.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Fren 699R).
- Required courses: CLit 610; minimum 12 credit hours in French; maximum 12 credit hours, including CLit 610, in related fields such as comparative literature, humanities, linguistics, and Romance philology; 6 hours of Fren 699R (thesis).
- Writing project: thesis or three-paper option.
- Examination: comprehensive oral examination on course work and writing project.

Language Acquisition (French)—MA

See program description under Language Acquisition (p. 150).

FINANCIAL ASSISTANCE

Several graduate teaching fellowships and a few partial-tuition scholarships, based on need, will be available.

RESOURCES AND OPPORTUNITIES

The Department of French and Italian utilizes the **Humanities Research Center** for world-class computer-assisted language instruction and translation. Other resources are:

The Foreign Language Student Residence. Students who desire a more intensive language study experience and practical application of the language under the direction of faculty and native residents may apply to live in the Foreign Language Student Residence. All activities in the individual apartments in the residence are conducted in the foreign language.

Graduate students may participate as students or as senior residents.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

French

670R. Tutorial Internship in French. (1-3)

Individual research in cooperation with graduate faculty member in problems relating to French. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in French. (1-3)

Individual study supervised by graduate faculty member in varying topics of specific interest in French.

690R. Seminar in French. (1-3)

Group studies supervised by graduate faculty member in varying topics of specific interest in French.

699R. Master's Thesis. (1-6)

Linguistics

(See Linguistics section of this catalog for courses.)

FACULTY

BELL, MARK E., *Assistant Professor.*

PhD, University of Utah, 1991.
French Literature (Francophone);
Literary Theory.

BUSH, MICHAEL D., *Associate Professor.*

PhD, Ohio State University, 1983.
Language Acquisition (Computer-Assisted Learning).

COTTLE, MICHAELA V., *Assistant*

Professor. PhD, University of North Carolina, Chapel Hill, 1992. French Literature (Twentieth Century, Camus).

HURLBUT, JESSE D., *Assistant Professor.*

PhD, Indiana University, 1990.
French Literature (Medieval Drama, Renaissance Processionals).

LAMBERT, L. GARY, *Associate Professor.*

PhD, Rice University, 1969. French Literature (Seventeenth Century, Rousseau, Voltaire).

LE BRAS, YVON, *Assistant Professor.*

PhD, Laval University, 1992.
French Literature (Francophone).

SOWELL, MADISON U., *Professor.* PhD,

Harvard University, 1979. Italian and Comparative Literature (Middle Ages, Renaissance);
Descriptive Bibliography.

UNLANDT, NICOLAAS G. W., *Assistant*

Professor. DLitt, University of Amsterdam, Holland, 1992. French Literature (Middle Ages, Old French, Provençal).

GEOGRAPHY

Chair: Richard H Jackson

Graduate Coordinator: Alan H. Grey

690-F SWKT

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THE PROGRAM OF STUDIES

The master of science in geography is designed to allow students with a major or minor in geography to focus on an area of specialization within the discipline. Geography has been described as the "science of place"—studying human-environment relationships that create the uniqueness of each place.

The department goals focus on providing graduate students experience in research and analysis of the physical and cultural phenomena that shape the world. Seminars and other course work are designed to train graduate students in the geographic research, writing, and presentation skills necessary for employment or further graduate study.

Academically, the department integrates traditional course work with fieldwork and computer analysis of data to train students who can contribute to the solution of the real world issues facing human use of the earth today. The department's computer-based Cartography and Geographic Information Systems Laboratory is one of the premier training centers in GIS in the American west. Combined with the research interests of the department faculty, which are global in their diversity, it provides an unparalleled opportunity for graduate students to experience the excitement of research and creativity.

The average number of students admitted to the program each year is ten; the average duration of the degree program is one and a half years.

One degree is offered through the Department of Geography: Geography—MS.

Geography—MS

This program is designed to provide a general background at the graduate level for either a terminal degree or preparation for more advanced work. Areas of specialization within the degree: Cartography, Geography, Planning.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 15 (U.S. and international).
- Application requirements: minimum 3.0 GPA for last 60 semester credits; three *academic* letters of recommendation; and statement of intent describing field of interest and career goals. Decisions to admit are made by mid-March.
- Entrance examination: GRE general test. Scores must be received by February 15.
- Prerequisite: undergraduate minor in geography or equivalent; strong language background for area studies emphasis; and business mathematics or statistics background for business or industry emphasis.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Geog 699R).
- Required courses: Geog 600R (3 credit hours, 2 taken fall and 1 taken winter), 605, 620, 621, 625.
- No more than 7 hours total from cooperative education (see course descriptions that follow), special problems, or readings courses may be applied toward the degree.
- Minor (optional): supporting courses chosen in consultation with committee.
- Thesis.
- Examination: oral defense of thesis.

FINANCIAL ASSISTANCE

There is no financial aid offered from the Geography Department. Partial tuition help is available in the form of

scholarships awarded by the department for qualifying students after their first semester in the program. Graduate students are employed as research assistants, teaching assistants, and graders.

RESOURCES AND OPPORTUNITIES

GIS Laboratory. Housed in the Geography Department, this \$1.3 million laboratory contains state-of-the-art UNIX and PC workstations devoted to cartography, GIS analysis, terrain modeling, digital photogrammetry, and satellite image processing. The lab also contains peripherals for scanning, digitizing, and large-format plotting. To ensure that the latest technology is always available, by policy all software is updated annually. To assist in field mapping, high-accuracy global positioning system equipment is provided for qualified students' use. In addition, the laboratory contains photo interpretation equipment, a copy camera, darkroom, and printing facilities needed for traditional and hybrid map production.

Land Use and Regional Studies

Laboratory. The department has a computer laboratory devoted to land use planning and regional studies, and workstations, printers, and data sets for use by students and faculty for research related to course work and student and faculty research.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

501R. Topics in Systematic Geography. (1–3)

Detailed investigation of selected geographic topics.

502R. Seminar in Regional Geography. (1–3)

510. Advanced Urban Dynamics and Planning. (3)

Prerequisite: Geog 310, 410, or equivalent.

Advanced study in urban geography and land use planning; emphasizes urban morphology, land use patterns, and spatial analysis; critical evaluation of models and theories.

512. Cartographic Reproduction. (3)

Prerequisite: Geog 312, 412.

Color map production using separations and precision registration for reproduction.

513. (Geog-CEEn) Photogrammetry and Remote Sensing. (3)

Prerequisite: CEEEn 113.

Using data obtained from visible portion (photographs) and broader range (radiometers, radar, microwaves, infrared, remote, etc.) of electromagnetic spectrum to solve engineering problems. Maps, mapping procedures, and photo and electronic data interpretation.

515. Geographic Information Systems (GIS). (3)

Prerequisite: Geog 211.

Applying GIS techniques to solving geographic problems in natural and cultural environments, emphasizing planning and resource management.

517. Analytical Cartography. (4)

Prerequisite: CS 142, Geog 515.

Geocoding, spatial data representation, map-based transformations, and cartographic modeling.

580. Geography of the Developing World. (3)

Analysis and description of the developing world from a spatial perspective; emphasis on environmental challenges to development.

599R. Cooperative Education. (1–3)

On-the-job experience. No more than 3 hours in cooperative education may apply toward any one degree.

600R. Graduate Colloquium. (1-3)

Prerequisite: graduate standing.

Nature of geographical investigation and the problems of graduate work.

605. History and Philosophy of Geography. (3)

Analysis of the intellectual history and related paradigms associated with geography as a professional discipline.

612. Seminar in Cartography and Geographic Information Systems. (2)

Prerequisite: Geog 515.

Integration of remote sensing, geographical information systems, photogrammetry, and field work for solving geographic mapping problems.

620. Seminar in Cultural Geography. (3)

621. Seminar in Physical Geography. (3)

625. Spatial Theory and Analysis. (3)

Examination and spatial application of the mathematical and statistical theories utilized in explaining and predicting geographical phenomena.

690R. Readings. (1-2)

695R. Special Problems. (1-3)

699R. Master's Thesis. (1-6)

FACULTY

DAVIS, JAMES A., *Assistant Professor*. PhD, Arizona State University, 1993. Urban Planning; Cultural Geography.

EMMETT, CHAD, *Assistant Professor*. PhD, University of Chicago, 1991. Middle East; Political and Cultural Geography.

GREY, ALAN H., *Professor*. PhD, University of Wisconsin, Madison, 1963. New Zealand; General; Historical.

HARDIN, PERRY J., *Associate Professor*. PhD, University of Utah, 1989. Cartography; Geographic Information Systems; Remote Sensing.

HINCKLEY, THOMAS K., *Associate Professor*. PhD, University of Western Ontario, Canada, 1979. Cartography.

HUDMAN, LLOYD E., *Professor*. PhD, University of Kansas, 1970. Urban Geography; Travel and Tourism.

JACKSON, RICHARD H., *Professor*. PhD, Clark University, 1970. North America; Cultural Geography; Planning.

SHUMWAY, J. MATTHEW, *Assistant Professor*. PhD, Indiana University, 1991. Population; Economic Geography.

GEOLOGY

Chair: Dana T. Griffen

Graduate Coordinator: Bart J. Kowallis

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THE PROGRAM OF STUDIES

Geology is the science that reveals how the earth works. The graduate program in geology at Brigham Young University is designed to prepare scientists to find solutions to many of the environmental and resource problems society faces.

The department offers one degree: Geology—MS. Areas of specialization include: Earth Science Education, Environmental Geology, and Geology.

The expected duration of the MS program is two years for full-time students who enter without deficiencies. The MS degree is designed to give the student a solid foundation in the theoretical and applied aspects of geology and a strong research experience. The thesis component allows each student to develop skills in defining a significant problem, developing a research strategy, acquiring and analyzing data, and technical writing. An MS degree in geology prepares a student for a wide variety of employment opportunities in industry, education, and government, or for advanced study toward a doctoral degree.

The department currently has from approximately twenty to twenty-five graduate students in the MS program.

Geology—MS

Pursuit of the MS degree not only helps prepare students for exciting career opportunities in areas of distinct benefit to mankind, but it also allows them to experience the challenges and rewards of modern scientific research.

It is expected that the thesis work will culminate in new understanding of a problem of scientific significance and that results will be published in a reputable scientific journal.

Areas of specialization: Earth Science Education, Environmental Geology, and Geology.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international); winter, September 15 (U.S. and international).
- Application requirements: minimum required GPA is 3.0 overall and in all physical sciences (mathematics, chemistry, physics), as well as in geology courses.
- Entrance examination: GRE general test. GRE scores must be received in the Geology Department before application for admission will be considered.
- Prerequisite: baccalaureate degree. Arrangements to satisfy undergraduate deficiencies will be made in consultation with graduate coordinator.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Geol 699R); 1 hour of Geol 591R.
- Required courses:
Geology: to be determined in consultation with advisor.
Environmental Geology: Geol 635, 636, 637; 12 hours from Geol 411, 435, 436, 521, 559, 560, 590R (approved by graduate committee), AgHrt 511, ChEn 411, CEEEn 545, 550, 555, 641, 654, Hlth 454. Recommended: Stat 501, 502.
Earth Science Education: Geol 502, 697R (approved by graduate committee), ScEd 531; 6–9 hours from Geol 411, 435, 440, 445, 451, 460, 480; 6 hours from IS 551, 564, 620, 652, 661, ScEd 601.
 Any additional graduate courses in geology approved by graduate committee may be taken to satisfy remainder of 24 course work hours.
- Publishable thesis.

- Examinations: (A) comprehensive oral examination on course work; (B) final oral defense of thesis.

FINANCIAL ASSISTANCE

New graduate students are eligible for departmental scholarships, tuition waivers, and teaching or research assistantships on a competitive basis.

Most regular degree-seeking students receive *some form* of financial aid. However, none may expect financial assistance from the department for more than four semesters.

Graduate students are also encouraged to seek additional support from industries and agencies outside the Department of Geology. **Note:** Such requests must be submitted to the department chair, who will forward them with a supporting letter.

RESOURCES AND OPPORTUNITIES

The Department of Geology will move into the newly remodeled Eyring Science Center in 1997. Extensive renovation includes the construction of state-of-the-art classrooms with multimedia capabilities, new office space for faculty and graduate assistants, and modern laboratories. The new facilities will house extensive instrumentation, computer facilities, and mineral, rock, and fossil collections.

The location of the university campus on the Wasatch Front near the juncture of the Rocky Mountains, the Colorado Plateau, and the Great Basin provides an incomparable natural laboratory for geology studies. The Department of Geology utilizes this natural setting, and the many geologic problems that remain in it to be studied, as one of our main assets.

The department is well equipped for graduate research in geology. A partial list of research equipment available includes: an X-ray fluorescence spectrometer, atomic absorption spectrophotometers, a gradient elution ion chromatograph, an automated single-

crystal X-ray diffractometer, powder X-ray diffractometers, a visible/UV spectrophotometer, a cathodoluminescence microscope, a fluid inclusion heating and freezing stage, a core plug porosimeter/permeameter, Wor-den gravimeters, proton precession magnetometers, a ground-penetrating radar system, a twenty-four-channel seismic system, variable offset electrical resistivity equipment, and a Mössbauer spectrometer. Additional research facilities include:

The Earth Science Museum. This developing museum with affiliated laboratories houses major fossil groups, including one of the best dinosaur collections in the country. It also offers significant, and in some cases unique, assemblages of rocks, minerals, and maps, providing many research opportunities for faculty and students.

Fission Track Dating Laboratory. This laboratory provides student and faculty researchers with the geochronological potential to solve problems in stratigraphy and structural geology, to determine rates of uplift and subsequently to aid in thermal modeling, and to provide support for numerous other faculty and student research projects where dating of events is necessary.

Hydrogeochemistry Laboratory. The hydrogeochemistry lab supports research programs in hydrology, environmental geology, economic geology, and petrology. In addition, the lab is used in teaching modern analytical techniques in upper-division undergraduate and graduate courses. Groundwater composition, migration, and pollution have been major emphases of research.

Faculty research interests currently include: studies of regional Cenozoic magmatism and tectonism in the Great Basin; composition of thermal waters; Cenozoic mammals in Mexico; Jurassic dinosaurs; Jurassic and Cretaceous bentonites; location and distribution of underground hazardous waste using geophysical methods; crystallography and crystal chemistry

of silicate minerals; investigations of shallow subsurface geology using gravity, seismic, electrical, and magnetic methods; origins of copper and molybdenum deposits; tungsten skarns; characterization of petroleum reservoir quality and trapping potential; Devonian ammonoids; and Carboniferous-Permian conodont biostratigraphy in the U.S. and Russia.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

510. Conducted Field Trips. (1)

Prerequisite: any college-level geology course and instructor's consent.

Geology field trips.

511. Advanced Structural Geology. (3)

Prerequisite: Geol 311, 410.

In-depth discussions of a variety of topics in structural geology, emphasizing current literature and problems.

520. Petroleum Geology. (3)

Prerequisite: Geol 311, 370.

Origin, migration, and entrapment of liquid and gaseous hydrocarbons.

521. Borehole Geophysics and Geology. (3)

Prerequisite: Phscs 121, 122, Geol 351, 370.

Applied well log analysis, including conventional and new techniques. Subsurface geology and lithology determined from electrical, acoustical, radioactive, and other logs.

525. Basin Analysis. (3)

Prerequisite: Geol 370.

Tectonic basin development, including extensional, compressional, flexural, and strike-slip processes. Processes of basin-fill and thermal histories emphasizing sequence and seismic stratigraphy.

545. Isotope Geochemistry. (3)

Prerequisite: Geol 352.

Use of stable and radioactive isotope systematics in geochronology and investigation of origins of rocks and waters.

551. Advanced Mineralogy. (3)

Prerequisite: Geol 351, Phscs 121, 122, 221.

Crystallography, structure, and crystal chemistry of major silicate mineral groups.

556. Applied Geomathematics. (3)

Prerequisite: Math 112, 113, Phscs 121, 122, 221.

Applications of algebra, geometry, trigonometry, calculus, matrices, computers, and statistics to the analysis and interpretation of geoscience data.

559. Applied Geophysics 1. (3)

Prerequisite: Geol 311, Phscs 121, 122, 221.

Principles, tools, and methods in gravity, magnetic, and electromagnetic exploration. Includes acquisition, processing, and interpretation of gravity and magnetic data.

560. Applied Geophysics 2. (3)

Prerequisite: Geol 311, 559, Phscs 121, 122, 221.

Principles, tools, and methods used in seismic geophysics, with engineering, environmental, exploration, and hydrological applications. Includes acquisition, processing, and interpretation of seismic data.

565R. Special Topics in Geology. (2-4)

Prerequisite: instructor's consent.

The following topics may be offered on demand: Geology for Teachers, X-Ray Crystallography, Instrumental Methods, Ore Deposits.

574. Advanced Stratigraphy. (3)

Prerequisite: Geol 370 or equivalent. Recommended: Geol 480 or equivalent.

Study of the stratigraphic record through modern methods of correlating stratal packages, emphasizing concepts of chronostratigraphy, biostratigraphy, lithostratigraphy, and absolute dating. Extended field trip required.

580. Principles of Paleontology. (3)

Prerequisite: Geol 480.

Modern approaches to fossil study applied to areas of evolution, paleoecology, and biostratigraphy.

586. Vertebrate Paleontology. (4)

Prerequisite: instructor's consent.

History of vertebrate fossils. Field trips required. Credit applies in either zoology or geology. Laboratory studies.

590R. Short Courses. (1-3)

Short graduate-level courses offered on a random basis.

591R. Seminar. (0.5)

Seminars on various geologic topics by guest speakers. Total of 1 credit hour required.

599R. Cooperative Education. (1-9)

635. Advanced Hydrogeology. (3)

Prerequisite: Geol 435; Math 321 or concurrent registration.

Equations governing fluid flow through saturated porous media under various geologic conditions; applying hydraulic characteristics to analysis of well and aquifer conditions.

636. Hydrogeochemistry. (3)

Prerequisite: Geol 435 or instructor's consent; Chem 105, 106, 107, or 111, 112.

Nature and origin of solutes and isotopes in groundwater systems. Applying geochemistry to evaluation of groundwater recharge conditions and flow patterns.

637. Groundwater Modeling. (3)

Prerequisite: Geol 435 or instructor's consent; Chem 105, 106, 107, or 111, 112.

Computer modeling and groundwater systems.

655. Igneous Petrology. (3)

Prerequisite: Geol 552.

Origin and crystallization behavior of magmas, emphasizing crystal-liquid relations in simple experimental systems.

671. Sedimentary**Petrology—Carbonate Rocks. (3)**

Prerequisite: Geol 370.

Characteristics and significance of limestones and dolomites.

672. Sedimentary Petrology—Clastic Rocks. (3)

Prerequisite: Geol 370.

Characteristics of conglomerates, sandstones, and shales. Provenance studies of various terrains by thin section analysis. Extended field trip required.

695R. Research. (1–4)**696R. Readings and Conferences in Geology. (1–4)****697R. Directed Field Studies. (1–6)****699R. Master's Thesis. (6–9)****FACULTY**

BAER, JAMES L., *Professor. PhD,*
Brigham Young University, 1968.
Geologic Engineering.

BENSON, ALVIN K., *Professor. PhD,*
Brigham Young University, 1972.
Geophysics; Environmental
Geophysics.

BEST, MYRON G., *Professor. PhD,*
University of California, Berkeley,
1961. Petrology; Tectonics.

CHRISTIANSEN, ERIC H., *Professor.*
PhD, Arizona State University,
1981. Petrology; Geochemistry.

GRIFFEN, DANA THOMAS, *Professor.*
PhD, Virginia Polytechnic Institute,
1975. Mineralogy; Crystallography.

KEITH, JEFFREY D., *Professor. PhD,*
University of Wisconsin, 1982.
Economic Geology; Geochemistry;
Environmental Geology.

KOWALLIS, BART J., *Professor. PhD,*
University of Wisconsin, Madison,
1981. Structural Geology;
Geochronology.

MAYO, ALAN L., *Professor. PhD,*
University of Idaho, 1981.
Hydrogeology; Environmental
Geology.

MILLER, WADE E., *Professor. PhD,*
University of California, Berkeley,
1968. Vertebrate Paleontology.

MORRIS, THOMAS H., *Assistant
Professor. PhD, University of
Wisconsin, Madison, 1986.*
Sedimentology; Stratigraphy.

RITTER, SCOTT M., *Associate Professor.*
PhD, University of Wisconsin,
Madison, 1986. Invertebrate
Paleontology; Carbonate Petrology.

**GERMANIC AND SLAVIC
LANGUAGES**

Chair: Alan F. Keele

*Graduate Coordinator for German
Literature:* Thomas Plummer

4094 JKHB
PO Box 26115
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THE PROGRAM OF STUDIES

One degree is offered through the Department of Germanic and Slavic Languages: German Literature—MA. An additional MA in language acquisition (German, Russian, or Scandinavian) is offered as part of the collegewide program in language acquisition (see p. 150).

From four to six students are admitted to the literature program each year. Most students complete the degree within two years.

German Literature—MA**Admission and Entry.**

- Semesters of entry and application deadlines: fall, February 28 (international) and April 1 (U.S.); winter, June 30 (international) and September 1 (U.S.).
- Application requirements: entrance examination is GRE general test.
- Prerequisite: baccalaureate degree in German or in a related field such as English, comparative literature, humanities, etc. Minor deficiencies in German linguistics, culture, or other background areas may be made up by enrolling in appropriate undergraduate courses. German language proficiency in all four skills at the advanced level as defined by the American Council on Teaching of Foreign Languages (ACTFL)—equivalent to the Inter-agency Language Roundtable (ILR) level 2.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Germ 699R).
- Required courses: 3 hours from CLit 620R, 630R, 640R, 650R, 660R (should be a German-related topic; see graduate advisor before registering); 21 hours of German graduate courses; 6 hours of Germ 699R (thesis).
- A reading knowledge of a second foreign language (fourth semester or equivalent).
- Examination: oral examination on reading list (see graduate advisor), course work, and thesis.

FINANCIAL ASSISTANCE

Partial tuition assistance is available. Most MA students also work as paid teaching assistants.

RESOURCES AND OPPORTUNITIES

The Department of Germanic and Slavic Languages has access to the **Humanities Research Center** for computer-assisted language instruction and translation. Other resources are:

The Foreign Language Student Residence. Students who desire a more intensive language study experience and practical application of the language under the direction of faculty and native residents may apply to live in the Foreign Language Student Residence. All activities in the individual apartments in the residence are conducted in the foreign language. Housing is available for men and women in German, French, Spanish, Italian, Portuguese, Russian, Japanese, Chinese, Arabic, and Korean languages. Graduate students may participate as students or as senior residents.

The Summer Language Institute. During the summer term the College of Humanities offers a program that allows a student total immersion in a foreign language while receiving course credit. Housing is provided for participants where the language can

be applied on a practical level. Employment is available for graduate students.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

German

615. Applied German Linguistics. (3)
On dem.
Prerequisite: Germ 450, 460, or equivalent.

Applying linguistics to the problems of teaching German grammar.

640R. German Literary Periods and Movements. (3)

In-depth study of a period or movement such as medieval, Renaissance, baroque, or eighteenth-century Germany; Romanticism; realism; fin-de-siècle Vienna; naturalism; 1890–1945; 1945–present.

641R. Studies in German Literary Genres. (3)

In-depth study of a genre such as drama, novel, novella, lyric, film.

642R. Major German Authors. (3)

In-depth study of one author such as Lessing, Goethe, Schiller, Kleist, Storm, Rilke, Brecht, Mann, Kafka, or Hofmannsthal.

643R. Studies in Literary Theory. (3)

In-depth study of primary texts by contemporary literary theorists. May include topics such as Marxist criticism, feminist criticism, reader response, or poststructuralism.

670R. Tutorial Internship in German. (1–3)

Individual research in cooperation with graduate faculty members in problems relating to German. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisors.

680R. Special Studies in German. (1–3)

Individual study supervised by graduate faculty members in varying topics of specific interest in German.

690R. Seminar in German. (3)

Group studies supervised by graduate faculty members in varying topics of specific interest in German.

699R. Master's Thesis. (1–6)

Linguistics

(See Linguistics section of this catalog for courses.)

Russian

670R. Tutorial Internship in Russian. (1–3)

Individual research in cooperation with graduate faculty members in problems relating to Russian. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisors.

680R. Special Studies in Russian. (1–3)

Individual study supervised by graduate faculty members in varying topics of specific interest in Russian.

690R. Seminar in Russian. (1–3)

Group studies supervised by graduate faculty members in varying topics of specific interest in Russian.

699R. Master's Thesis. (1–6)

Scandinavian

529. Old Norse. (3)

Recommended: knowledge of a modern Scandinavian language.

Returned missionaries from Iceland or those with equivalent experience should enroll in Inclnd 429. Grammar and exercises. Readings in Old Norse literature.

590R. Directed Readings in Scandinavian. (1–3)

Prerequisite: written plan of study approved by both the instructor and program coordinator.

Directed individual study.

670R. Tutorial Internship in Scandinavian. (1-3)

Individual research in cooperation with graduate faculty members in problems relating to Scandinavian. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

690R. Seminar in Scandinavian. (1-3)

Group studies supervised by graduate faculty members in varying topics of specific interest in Scandinavian.

699R. Master's Thesis. (1-6)

FACULTY

ABBOTT, SCOTT, *Associate Professor*.

PhD, Princeton University, 1979.
German Literature (Eighteenth, Nineteenth, Twentieth Centuries); Literary Theory.

BAKER, JOSEPH O., *Associate Professor*.

PhD, Tulane University, 1968.
German Literature (Kleist, Realism).

BROWNING, GARY L., *Professor*. PhD,

Harvard University, 1974. Russian Literature (Nineteenth- and Twentieth-Century Writers).

DAVIS, GAROLD NEIL, *Professor*. PhD,

Johns Hopkins University, 1962.
German Literature (Romanticism, Realism, *Heimatsdichtung*, Goethe's *Faust*).

HART, DAVID KAY, *Associate Professor*.

PhD, University of Washington, 1979. Russian Language (Phonology, Morphology, Syntax).

JARVIS, DONALD K., *Professor*. PhD,

Ohio State University, 1970.
Russian Language (Pedagogy, Testing).

JONES, RANDALL L., *Professor*. PhD,

Princeton University, 1970.
German Language (Technology and Second-Language Acquisition); Pedagogy; German Corpus Linguistics.

KEELE, ALAN F., *Professor*. PhD,

Princeton University, 1971.
German Literature (Earlier Twentieth Century, 1945-Present, Rilke, Grass).

KELLING, HANS-WILHELM, *Professor*.

PhD, Stanford University, 1967.
German Literature (*Goethezeit*); Cultural History.

LUND, RANDALL J., *Assistant Professor*.

PhD, University of Minnesota, 1986. Foreign Language Methodology; Teacher Education.

LYON, JAMES K., *Professor*. PhD,

Harvard University, 1963. German Literature (Holocaust, Brecht, Celan).

NEMIROVSKAYA, JULIA, *Assistant*

Professor. PhD, Moscow State University, 1991. Russian Literature (Poetry, Contemporary Literature).

PLUMMER, THOMAS G., *Professor*. PhD,

Harvard University, 1972. German Literature (Weimar Period, Berlin, Modernism); German Film.

ROGERS, THOMAS E., *Professor*. PhD,

Georgetown University, 1968.
Russian Literature (Twentieth-Century Drama); Film.

SOLOVYOVA, RAISA, *Assistant Professor*.

PhD, Novosibirsk State University, Russia, 1982. Russian Literature (Nineteenth and Twentieth Century).

STRAUBHAAR, SANDRA, *Assistant*

Professor. PhD, Stanford University, 1982. Scandinavian Languages, Literature, and Culture; Old Norse; Old and Middle High German.

STOTT, MICHELLE, *Associate Professor*.

PhD, University of Utah, 1987.
German Literature (Lessing, Eighteenth and Nineteenth Centuries, Women's Studies).

HEALTH SCIENCES

Chair: Keith J. Karren

Graduate Coordinator: Ron L. Rhodes

229-H RB

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(801) 378-3327

THE PROGRAM OF STUDIES

The Department of Health Sciences is committed to the proposition that quality of life can be maintained or improved through understanding and applying disease/disability prevention and health enhancement principles. Such principles are relevant to the physical, emotional, social, intellectual, and spiritual well-being of individuals and groups in vocational, community, and family settings. The departmental mission is to prepare professionals to function in and for these settings as health education and health promotion specialists.

The purpose of the graduate program is to prepare individuals to be leaders and administrators in health education and health promotion programs in a variety of settings.

One degree is offered through the Department of Health Sciences: Health Sciences—MS.

The department usually admits ten students to its MS program in the fall semester of each academic year. The average length of time required to complete the degree is from one to two years, depending on course load and previous academic training or professional activity.

Health Sciences—MS

The department offers a master of science degree with emphases in Community Health, School Health, and Health Promotion. The master's degree in community health is frequently the entry-level requirement for community health professional

positions. The master's degree in school health is usually used to pursue a lane or level change as well as to prepare for a doctoral program. The health promotion master's degree is most often required to function in administrative positions in that profession.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination: GRE general test.
- GPA: minimum 3.0 for last 60 hours of undergraduate work.
- Prerequisite: baccalaureate degree with a major or minor in community health, health education, health promotion, biological sciences, nursing, physical education, therapeutic recreation, or other allied fields. Applicants will be required to satisfy any deficiencies. Courses taken in doing so will not count toward the required hours for the degree.

Requirements for Degree.

- Credit hours (36): minimum 30 hours of course work plus 6 hours of thesis.
- Required core courses: Stat 552; Hlth 650, 651, 652 or 455, 692, 694.
- Required courses in emphases are determined by student's graduate committee based on prior education, experience, and present professional interests.
- Thesis: Hlth 692 and Stat 552 should be taken first semester or as early as possible in preparation for thesis.
- Examinations: oral defense of thesis.

FINANCIAL ASSISTANCE

Graduate teaching assistant positions are available for qualified students. Applications are available for research assistants and tuition scholarships.

RESOURCES AND OPPORTUNITIES

The Department of Health Sciences is housed in the Richards Building. Its in-house research facility is the **Human Performance Research Center**. The

center supports applied and basic research programs of faculty and graduate students on such topics as nutrition and exercise, drugs and exercise, exercise and cardiovascular disease, exercise and weight control, and other contemporary issues in exercise science. In addition to serving graduate students and faculty in the college, the center works closely with departments in other colleges on campus—notably in the fields of physiology, nutrition, endocrinology, and biochemistry—to broaden the scope of research projects and encourage collaborative efforts.

Another resource is the **Learning Resource Center**, which offers eighteen individual study areas and significant PC capabilities, audio and video equipment, and line access to library files and catalogue.

Internships with attendant project opportunities provide a varied resource for individuals and cooperative investigations. Additional assistance in research planning and statistical analysis is available through other support programs existing on campus.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

599R. Cooperative Education. (Arr.)
Prerequisite: completion of a major in health sciences or graduate student status in health sciences.
On-the-job experience.

603R. Health Problems Workshop. (1-7)

Current problems in school and community health.

650. Review and Processing of Health Information. (3)

Source evaluation and content review of contemporary research in health sciences.

651. Community Organization for Health. (2)

Theory and practices in community organization for health. Evaluating group work methods and leadership theories. Field observations required.

652. Health Education Program Planning. (2)

Principles of health education program design, administration, marketing, and evaluation.

661. Curriculum Development and Instructional Design. (2)

Design and evaluation of health education curricula.

665. Behavioral Health. (2)

Analysis of current research and theory concerning health behaviors and psychological factors in the cause, prevention, development, and treatment of physical and behavioral illness and disorders.

666. Health and Aging Process. (2)

Advanced theories of the normal and pathological aging process, including health promotion and extension of life.

671. Graduate Practicum. (1)

Role and functions of the college health teacher. Supervised experience in teaching and research.

692. Research Methods in Health Sciences. (3)

Designing, analyzing, and writing research, focusing on methodological skills.

694. Graduate Seminar in Health Sciences. (2)

696R. Independent Studies. (1-3)

698R. Master's Project. (1-6)

699R. Master's Thesis. (1-9)

FACULTY

- HAFEN, BRENT Q.**, *Professor. PhD*, Southern Illinois University, 1969. Behavioral Health; Research.
- HEINER, STEVEN W.**, *Professor. EdD*, University of Utah, 1969. Gerontology; Social Hygiene.
- HURLEY, D. RICHARD**, *Associate Professor. PhD*, Southern Illinois University, 1971. Statistics; Substance Abuse.
- KARREN, KEITH J.**, *Professor. PhD*, Oregon State University, 1975. Behavioral Health.
- LINDSAY, GORDON B.**, *Associate Professor. PhD*, Ohio State University, 1984. Community Health; Health Promotion.
- RHODES, RONALD L.**, *Professor. PhD*, Oregon State University, 1971. Health Promotion; Corporate Health.
- ROLLINS, L. MCKAY**, *Professor. PhD*, University of Utah, 1971. International Health; Administration.
- SALAZAR, RICHARD D.**, *Assistant Professor. PhD*, Southern Illinois University, 1972. Research Methods; Statistics.
- THYGERSON, ALTON L.**, *Professor. EdD*, Brigham Young University, 1969. Injury Prevention.

HISTORY

Chair: Kendall Brown
Graduate Coordinator: Malcolm R. Thorp

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 Provo, UT 84602-4446
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THE PROGRAM OF STUDIES

The History Department has a small but high-quality graduate program. It aims to strengthen the credentials of those teaching history and to produce professional historians.

The strengths of the program are U.S. (especially western American) and European history. This reflects the research interests of departmental faculty and the holdings of the university's Harold B. Lee Library.

Two degrees are offered through the History Department: History—MA and History—PhD.

The department admits ten students to the graduate programs each year. The average length of the MA program is two years; the average length of the PhD program is five years.

History—MA

The MA degree is offered for those students who desire to do further historical study and research beyond the bachelor's degree. The advantages of this degree include: opportunities in public history, access to careers in business, greater promotional and employment opportunities for secondary teachers, qualification for teaching positions in many junior colleges, and useful preparation for doctoral work in history, law, government, international affairs, and other relevant fields.

Areas of emphasis within the MA:
 American History or European History.

Students desiring a master's degree in Latin American, Asian, or Middle Eastern history should apply to the relevant program in the David M. Kennedy Center for International Studies.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: submit at least three letters of recommendation from persons familiar with applicant's academic qualifications, preferably professors, and a sample of applicant's work. Send directly to the department a research paper such as a senior seminar paper. Students whose native language is not English must pass the TOEFL examination at the 85th percentile or higher (a score of 580). Minimum required GPA is 3.0 for last 60 hours. Consult the History Department for further details before applying for admission.
- Entrance examination: GRE general test.
- Prerequisite: undergraduate degree in history or equivalent.

Requirements for Degree.

- Course requirements:
American History Emphasis (30 hours): minimum 24 course work hours including Hist 587, 690R; two courses selected from Hist 561, 562, 563; plus 6 thesis hours (699R).
European History Emphasis (30 hours): minimum 24 course work hours including Hist 587, 690R; one or more courses selected from Hist 661, 662, 663; plus 6 thesis hours (699R).
- Minor: optional as approved by graduate committee.
- Thesis.
- Examinations: (A) written comprehensive; (B) oral defense of thesis.

History—PhD

The PhD is designed to train students to be effective teachers, productive scholars, and useful professionals in the field of history. Professional opportunities for the doctoral graduate

include: careers in university, college, junior college, and high school teaching; library and archival work; the Church Educational System; government research agencies; and professional writing.

Areas of emphasis within the PhD: American History or European History. Fields of concentration in American History are Western America, History of Religion in America, and American Social History.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: send at least three letters of recommendation from persons familiar with applicant's academic qualifications, preferably professors, and a copy of applicant's master's thesis directly to the department. Students whose native language is not English are required to pass the TOEFL examination at the 85th percentile or higher (a score of 580). The minimum required GPA is 3.4 for last 60 hours. Consult the History Department for further details before applying for admission.
- Entrance examination: GRE general test.
- Prerequisite: master's degree in history or equivalent.

Requirements for Degree.

- Credit hours (54 beyond baccalaureate): minimum 36 course work hours beyond the baccalaureate plus 18 dissertation hours (Hist 799R).
- Course requirements: first year in residence—see current class schedule; consult with advisor.
- Core courses for European history emphasis: Hist 661, 662, 663.
- Core courses for American history emphasis: Hist 561, 562, 563 (other courses to be determined by graduate committee).
- Progress review: after 18 hours of course work, there will be an oral progress review in which the student's graduate committee will determine whether the student has

proved competent to remain in the program. Students should finish all course work and tool requirements and pass the written comprehensive examinations within three years after beginning the program.

- Skill requirement: consult department.
- Dissertation prospectus: presented upon successful completion of the oral comprehensive examination.
- Dissertation.
- Examinations: (A) comprehensive written examination in a general field (major area), a field of emphasis within that general field, and a secondary field in history; also a minor field outside history, chosen in consultation with the committee chair; (B) oral comprehensive examination, given after student successfully passes the written comprehensive examination.
- Oral defense of dissertation.

FINANCIAL ASSISTANCE

A small tuition grant can be provided to graduate students in the History Department. In addition, a teaching assistantship of 10 to 15 hours may be available to qualified graduate students.

RESOURCES AND OPPORTUNITIES

Center for Studies of the Family. This interdisciplinary research center focusing on studies related to all aspects of the family encourages and supports research on family-related topics ranging from prenatal development to problems of aging.

Women's Research Institute. Initially established in 1978, the Women's Research Institute became a part of the College of Family, Home, and Social Sciences in September 1983. Since then the institute has awarded research fellowships to upper-division and graduate students for conducting research on women and women's issues in amounts up to \$500 annually for selected projects. Faculty grants became available through the institute in 1984.

Joseph Fielding Smith Institute for Church History. The institute's purpose is to study the Latter-day Saint past. Its personnel are historians whose primary work is writing and publishing for professional and general Church audiences. The institute also seeks to facilitate the research of other Church history scholars by providing limited support for research and publication.

Museum of Peoples and Cultures.

This museum offers unique research opportunities for students and faculty, several of whom have research offices in the museum. Located south and west of campus in Allen Hall, the museum holds a number of important archaeological and ethnographic collections that have not been systematically analyzed and reported. These collections, which represent Utah Valley, the American Southwest, and Mesoamerica, as well as other parts of the world, provide material for thesis topics, professional publications, and academic credit.

Charles Redd Center for Western Studies. Established in 1972 under an endowment from Charles Redd, a prominent Utah stockman and philanthropist, the center is charged with promoting the study of all aspects of the American West. The center publishes a monograph series, assists faculty and student research through grants and fellowships, and sponsors lectureships each year.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500R. Special Studies in History. (1-3)

Directed by visiting or resident faculty. Check with department secretary for current topics and instructor.

561. Sources and Problems in Early America. (3)

Through the seventeenth and eighteenth centuries. Required of American and European history graduate students.

562. Sources and Problems in Nineteenth-Century America. (3)

Through the nineteenth century. Required of American and European history graduate students.

563. Sources and Problems in Twentieth-Century America. (3)

Through the twentieth century. Required of American and European history graduate students.

587. Philosophies of History. (3)

Fundamental problems and types of historical analysis and interpretation, philosophies of history, and work of outstanding historians.

590R. Special Topics. (3)

Western American, religious, family, Asian, Latin American, and Near Eastern history.

598R. Special Readings in History. (1-2)**661. Sources and Problems in Medieval, Renaissance, and Reformation History. (3)**

Selected topics in medieval, Renaissance, and Reformation history.

662. Sources and Problems in Early Modern Europe, 1550-1789. (3)

Selected topics in early modern Europe, 1550-1789. Part of the core curriculum for graduate students.

663. Sources and Problems in Modern Europe, 1789-Present. (3)

Selected topics in nineteenth- and twentieth-century Europe, 1789-present.

690R. Graduate Seminar in History. (1-3)**695R. Coordinated Research. (3)**

Student research directed by faculty member on topic of mutual interest. Prior approval of instructor required. Research assistants must do additional work for credit.

696R. Practicum in Public History and Family History. (1-5)

College credit for work in local archives, museums, and related areas. See department chair for openings available and to determine hours of credit.

698R. Master's Project. (1-6)**699R. Master's Thesis. (1-9)****798R. Special Readings in History. (1-2)****799R. Doctoral Dissertation. (1-18)****FACULTY****ALEXANDER, THOMAS G., Professor.**

PhD, University of California, Berkeley, 1965. Western American; Environmental; Mormon History.

BOHAC, RODNEY D., Associate

Professor. PhD, University of Illinois, 1982. Russia; Rural Europe.

BRITSCH, R. LANIER, Professor. PhD,

Claremont Graduate School, 1967. Asian Religions; Missiology.

BROWN, KENDALL W., Professor. PhD,

Duke University, 1979. Latin America; Colonial Economic; Spain.

BUTLER, LEE A., Assistant Professor.

PhD, Princeton, 1990. Early-Modern and Modern Japan; Asia

CANNON, BRIAN Q., Assistant Professor.

PhD, University of Wisconsin, 1992. American Rural History.

DOXEY, GARY B., Assistant Professor.

PhD, Cambridge University, 1992. Medieval Mediterranean.

EPPELSON, STEVE, Assistant Professor.

PhD, Temple University, 1991. American Religious.

FOX, FRANK W., Professor. PhD,

Stanford University, 1973. Modern U.S.; U.S. Cultural History.

GARCIA, IGNACIO, Assistant Professor.

PhD, University of Arizona, 1995. American, Mexican-American History.

GOWANS, FREDERICK R., Professor.

PhD, Brigham Young University, 1972. Western America; American Indian; Fur Trade.

GRANDSTAFF, MARK, Assistant

Professor. PhD, University of Wisconsin, Madison, 1992. American Military; Diplomatic.

GREEN, ARNOLD H., Professor. PhD,

University of California, Los Angeles, 1973. Modern Near East.

HAMBLIN, WILLIAM, Associate Professor.

PhD, University of Michigan, 1985. Middle East.

HARLINE, CRAIG H., Associate Professor.

PhD, Rutgers University, 1986. Early Modern Europe.

HOLMES, BLAIR R., Associate Professor.

PhD, University of Colorado, 1972. European Family; Social History.

MADSEN, CAROL CORNWALL, Professor.

PhD, University of Utah, 1985. Women's History; American History.

MONTGOMERY, DAVID C., Professor.

PhD, Indiana University, Bloomington, 1971. Central Asia; Middle East; Central Asian and Middle Eastern Languages.

PEARCY, THOMAS L., Assistant

Professor. PhD, University of Miami, 1993. Latin America; Nineteenth- and Twentieth-Century.

PIXTON, PAUL B., Professor. PhD,

University of Iowa, 1972. Medieval Europe.

PRATT, DAVID H., Professor. PhD,

University of Nebraska, Lincoln, 1975. British Family; Modern English.

RICHARDS, MARY STOVALL, Associate

Professor. PhD, University of Chicago, 1983. Family; Nineteenth-Century America—South; Twentieth-Century Southern Novelists.

THORE, MALCOLM R., Professor. PhD,

University of Wisconsin, Madison, 1972. Early Modern; Modern Britain.

TOBLER, DOUGLAS F., *Professor*. PhD, University of Kansas, 1967. Modern Germany; European Intellectual History.

WALKER, RONALD W., *Professor*. PhD, University of Utah, 1977. American Religious History; Utah History.

WESTOVER, V. ROBERT, *Assistant Professor*. PhD, Arizona State University, 1979. Family; American Indian.

WRIGHT, DAVID C., *Assistant Professor*. PhD, Princeton University, 1993. China; Asia.

YORK, NEIL LONGLEY, *Professor*. PhD, University of California, Santa Barbara, 1978. Colonial History; Technology; American Revolution.

HUMANITIES, CLASSICS, AND COMPARATIVE LITERATURE

Chair: John F. Hall

Graduate Coordinator: Steven P. Sondrup

Associate Graduate Coordinator: George S. Tate

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(801) 378-4448

THE PROGRAM OF STUDIES

Widely used in the Renaissance, the term *humanities* (*humanitas* or *studia humanitatis*) refers to the study of human intellectual and artistic creativity. Humanities is both a general academic category (inclusive of literature, history, philosophy, and the history and criticism of art and music) and a discipline in its own right with a methodology for the critical study of intellectual history and aesthetics. The interdisciplinary humanistic fields that the department comprises—humanities, classics, and comparative literature—offer students unusual latitude in developing rich graduate programs, disciplined by insistence on substantial foreign language skills, competence in critical theory and practice, and the development of scholarly abilities.

Three degrees are offered through the Department of Humanities, Classics, and Comparative Literature: Comparative Literature—MA; Humanities—MA; and Comparative Literature—PhD (minor).

Comparative literature and humanities each admit from five to six students per year. The MA programs are designed as two-year programs, and most full-time students are able to complete the MA within two years, usually defending the thesis during spring or summer term of the second year.

Classics. The classics graduate program has been temporarily furloughed. Until further notice, no students will be accepted into the program and no 500- or 600-level courses will be offered. It is possible, however, for students in humanities or comparative literature to do work in classics and the classical tradition as part of their graduate programs. Classics faculty occasionally serve on graduate committees in humanities or comparative literature; two have joint appointment in comparative literature.

Comparative Literature—MA

Comparative literature is the study of literature in its totality. Graduate students in this field combine the synthesizing and analytical skills of various humanistic disciplines with high-level foreign language achievement in order to study literary text closely. Accordingly, program courses expand knowledge of the discipline and provide intense opportunities to develop wide-ranging research writing abilities.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and May 15 (U.S.); winter, June 30 (international) and September 15 (U.S.); spring, October 31 (international) and February 15 (U.S.); summer, December 31 (international) and March 15 (U.S.).
- Entrance examination: GRE general test.
- Prerequisite: baccalaureate degree in literature; and thorough reading knowledge (300 level) of two of the three languages required for degree.

Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours (CLit 699R).
- Required courses: CLit 610, 6 hours of 620R (in two different periods), 6 hours from 630R, 640R, 650R, 660R, or 690R; and 699R.
- Electives: 12 hours of literature.
- Language requirement: thorough reading knowledge (300 level) of three languages, one of which must

be German or French, and one of which may be English for students who choose to emphasize British, American, or other anglophone literature.

- Thesis.
- Examination: final oral examination and defense of thesis.

Comparative Literature—PhD (Minor)

The PhD minor in comparative literature is designed to enrich the programs of doctoral students in other historical, theoretical, or humanistic disciplines by providing a framework for the formal consideration of interrelationships between literary study and other areas of knowledge.

Requirements for Degree.

- Credit hours: minimum 12 course work hours.
- Thorough knowledge of three literary traditions, one of which must be French or German, in two periods each.
- All readings done in original language.
- Examinations: written and oral examinations on areas of concentration. Students may be asked to demonstrate their facility with the languages relevant to their program during either or both of the examinations.

Humanities—MA

This degree provides training in humanities scholarship with a focus on interdisciplinary studies. Each aspect of the program has been designed to assist the graduate student in strengthening the skills required of scholars and teachers working in the field. Program courses concentrate on expanding knowledge of the field and of modes of interpretations. Courses also provide the student with opportunities to develop and expand research and writing skills in the humanities.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1.

- Entrance examination: GRE general test.
- Prerequisite: baccalaureate degree in humanities. Applicants with degrees in art history, history, literature, music, or philosophy may also be admitted but may be required to make up deficiencies in preparation through additional interdisciplinary course work. Also, completion of an upper-division literature course in a foreign language is required.

Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours (Hum 699R).
- Required courses: Hum 610, 630; one course each from 620R, 650R, and 690R, plus one additional course from this group; 699R.
- Electives: 12 hours in literature, art, music, history, or philosophy. To qualify, courses must approach these disciplines from theoretical, critical, or historical perspectives. (No more than 6 of these hours may be in upper-division undergraduate courses.)
- Thesis.
- Examination: final oral examination that focuses on areas of concentration but also requires some general knowledge; thesis defense.

FINANCIAL ASSISTANCE

Aid is available in the form of full or partial tuition grants, teaching assistantships, internships, and (for advanced students) some student instructorships. Upon admission to the respective programs, candidates will be considered for all of these possibilities based upon merit and availability of department resources. Financial aid is limited to two years.

RESOURCES AND OPPORTUNITIES

The Department of Humanities, Classics, and Comparative Literature utilizes the Humanities Research Center and the Reading-Writing Center for the College of Humanities:

The **Humanities Research Center** provides an array of technological tools, resources, and expertise to foster quality research and scholarship in the College of Humanities. The center is especially active in the production of teaching and research materials. In addition to computer and audio equipment, the center has a variety of video capabilities and in the past few years has become a world leader in computer-assisted language instruction and translation. The department also owns CD ROM databases for classical Greek and Latin texts, the *Thesaurus Linguae Graecae* and *Thesaurus Linguae Latinae*, as well as the complete works of many modern authors.

Faculty from the department currently serve as officers in the Classical Association of the Midwest and South (CAMWS), the International Comparative Literature Association (ICLA), the National Association of Humanities Educators (NAHE), the American Conference on Romanticism, and the Society for the Advancement of Scandinavian Study (SASS). In addition, the journals *Scandinavian Studies* and *Prisms: Essays in Romanticism*, as well as the *ICLA Bulletin*, are edited by department faculty members, assisted by graduate students from the department.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletins on humanities or comparative literature.

COURSE DESCRIPTIONS

Comparative Literature

590R. Directed Readings. (1-3)

Prerequisite: graduate coordinator's consent.

610. Methods of Study in Comparative Literature. (3)

Introduction to critical study of literature: critical methods and bibliography; linguistic foundations of literature; textual scholarship; literary history, transmission, theory, and criticism; genre theory; literature and other disciplines.

620R. Studies in Periods and Movements. (3)

Prerequisite: CLit 610 or concurrent registration.

Various literary periods, movements, etc., and problems of periodization. Topics vary.

630R. Studies in Literary Genres. (3)

Prerequisite: CLit 610 or concurrent registration.

Various genres (e.g., novel, epic, tragedy, lyric) and problems of genre. Topics vary.

640R. Studies in Themes and Types. (3)

Prerequisite: CLit 610 or concurrent registration.

Major literary themes (e.g., Faust, Don Juan, Ulysses, Arthur), types, motifs, and problems of literary typology. Topics vary.

650R. Studies in Literary Relations. (3)

Prerequisite: CLit 610 or concurrent registration.

Interrelations of national literatures and figures and of literature with other areas of knowledge (art, history, law, psychology, music, etc.). Topics vary.

660R. Studies in Literary Theory. (3)

Prerequisite: CLit 610 or concurrent registration.

Critical theories of literature and literary analysis. Topics vary.

670R. Tutorial Internship. (3)

Prerequisite: graduate coordinator's consent.

Individual research in cooperation with graduate faculty member, generally on problems relating to a specific national literature.

690R. Seminar in Comparative Literature. (3)

Prerequisite: CLit 610.

Problems in comparative literature. Course content varies from semester to semester.

699R. Master's Thesis. (1-9)

Prerequisite: graduate coordinator's consent.

Humanities

590R. Directed Readings. (1-3)

Prerequisite: graduate coordinator's consent.

610. Research Methods in Humanities. (2)

Prerequisite: instructor's consent.

Use of the library and secondary sources.

620R. Period Studies in the Humanities. (3)

Interdisciplinary study of literature, philosophy, and the arts of a particular period of cultural history. Topics vary.

630. Writing the Thesis Prospectus. (1)

Prerequisite: Hum 610.

Design and development of MA thesis prospectus.

650R. Movements in the Humanities. (3)

Interdisciplinary study of various movements in literature, philosophy, and the arts. Topics vary.

690R. Seminar in the Humanities. (3)

Interdisciplinary study of problems in the humanities (e.g., interrelationships among the arts, critical theory, and models of cultural history). Topics vary.

699R. Master's Thesis. (1-9)

Prerequisite: graduate coordinator's consent.

FACULTY

BASSETT, ARTHUR R., *Professor*. PhD, Syracuse University, 1975.
Humanities: American
Humanities; Victorian Art and Culture.

BENFELL, V. STANLEY, *Assistant Professor*. PhD, New York University, 1994. Comparative Literature: Medieval and Renaissance Literature (Italian, French, and English).

BRITSCH, TODD A., *Academic Vice President/Associate Provost, Professor*. PhD, Florida State University, 1966. Humanities: Art and Society; Interrelations of Arts.

BUTLER, TERRELL M., *Associate Professor*. PhD, Cornell University, 1979. Classics and Comparative Literature: Seventeenth-Century France and England; Greek Literature.

CALL, MICHAEL J., *Associate Professor*. PhD, Stanford University, 1982. Humanities: Eighteenth- and Nineteenth-Century French Literature and Arts; Romanticism.

DAVIS, NORMA S., *Associate Professor*. MA, Brigham Young University, 1975. Humanities: American Humanities; English Romanticism.

DEBLOIS, Nanci, *Assistant Professor*. PhD, University of Iowa, 1994. Classics: Greek and Latin Poetry.

DUCKWITZ, NORBERT H. O., *Assistant Professor*. PhD, University of Colorado, 1987. Classics: Latin Poetry; Greek and Roman Mythology.

GREEN, JON D., *Associate Professor*. PhD, Syracuse University, 1972. Humanities: Interrelations of the Arts; Modernism.

HALL, JOHN E., *Associate Professor*. PhD, University of Pennsylvania, 1984. Classics: Roman History, Religion, and Law; Latin Literature.

LOUNSBURY, RICHARD C., *Associate Professor*. PhD, University of Texas, Austin, 1979. Classics and Comparative Literature: Early Imperial Literature; Rhetoric; Later Classical Tradition.

MACFARLANE, ROGER T., *Assistant Professor*. PhD, University of Michigan, 1991. Classics: Republican and Augustan Latin Literature.

MARSHALL, DONALD R., *Professor*. PhD, University of Connecticut, 1971. Humanities: Film as Art; American Humanities.

PARRY, JOSEPH D., *Assistant Professor*. PhD, University of Utah, 1995. Humanities: Middle Ages and Renaissance; Critical Theory.

PEER, LARRY H., *Professor*. PhD, University of Maryland, College Park, 1969. Comparative Literature: Romanticism; Theory.

SHUMWAY, LARRY V., *Associate Professor*. PhD, University of Washington, 1974. Humanities: Asian Humanities; Ethnomusicology.

SONDRUP, STEVEN P., *Professor*. PhD, Harvard University, 1974. Comparative Literature: Nineteen- and Twentieth-Century Literature.

TATE, GEORGE S., *Professor*. PhD, Cornell University, 1974. Humanities and Comparative Literature: Medieval Studies (Scandinavian, German, English; Twelfth-Century Renaissance).

INSTRUCTIONAL SCIENCE

Chair: Paul F. Merrill

201 MCKB
PO Box 25089
Provo, UT 84602-5089
(801) 378-7072

THE PROGRAM OF STUDIES

Instructional science is a branch of educational study concerned with the ideas, principles, and theories related to the improvement of instruction. Students of instructional science seek to identify and implement improvements in instruction while endeavoring to understand the principles that govern these improvements. These solutions are implemented in educational settings in public schools and universities, business, industry, the government, the military, the community, and the church. The instructional science program at Brigham Young University teaches students the knowledge, methods, and technologies necessary for disciplined research into instructional issues.

The objective of the Department of Instructional Science is to enhance learning by improving instruction and teaching. In partnership with others, the department will (1) search for knowledge that improves instruction, (2) apply knowledge and technology to solve instructional problems, and (3) empower students with knowledge and skills in instructional development, research, and evaluation.

Students in each degree program are required to take basic courses in the following areas of disciplined inquiry in instruction: design and development, research, measurement, and evaluation. They are also required to acquire collateral tools from other disciplines such as statistics, computer science, human resource management, and communications. Specialized courses are offered to deepen the candidate's knowledge and theoretical sophistication. Professional skills

are developed through extensive project and internship experiences offered in the schools, church, home, and community.

The Department of Instructional Science offers three degrees: Instructional Science—MS, Instructional Science—PhD, and Instructional Psychology—PhD.

Approximately thirty students are enrolled in the MS program and fifty students in the PhD programs. Full-time students should be able to complete an MS degree within approximately two years; full-time PhD students with an MS in instructional science should be able to complete the PhD within three years.

Master's and doctoral students in other departments wishing to take a minor in instructional science should counsel with the instructional science faculty member appointed to their graduate committee in selecting the appropriate courses (9 hours of course work required for a master's minor, 12 hours for a doctoral minor).

Instructional Science—MS

The MS program is designed for students who desire to emphasize instructional design and production or computers in education. However, students may also emphasize research and evaluation. Considerable flexibility is built into the program to allow students to tailor their program in accordance to their background and professional goals.

Admission and Entry.

Fall semester and summer term entry only.

- Semesters of entry and application deadlines: fall, summer, February 1.
- Application requirements: letter of intent and three letters of recommendation.
- Entrance examination: GRE general test. When taking GRE, use institutional number R 4019. Application will not be considered without GRE scores.

- Prerequisite: (3 hours) ELdr 517 or Engl 316.

Requirements for Degree.

- Credit hours (minimum 35): 29 course work hours plus 6 thesis hours (IS 699R) or 6 project hours (698R).
- Required courses (14 hours): IS 515R (Microcomputers in Schools), 564, 652, 662 or 672, Stat 552.
- Emphasis: 12 hours to be determined in consultation with graduate committee.
- Internship: 3 hours (IS 680R).
- Thesis, 6 hours (IS 699R); or project, 6 hours (IS 698R).
- Examinations: oral defense of thesis or project.

Instructional Science, or Instructional Psychology—PhD

Designed to allow students to tailor their program in accordance to their background and professional goals, the PhD program includes specializations in instructional design and production, research and evaluation, instructional psychology, literacy education, and second language acquisition. The latter three specializations are joint programs with the Psychology Department, the Elementary Education Department, and the College of Humanities, respectively.

Admission and Entry.

Fall semester and summer term entry only.

- Semesters of entry and application deadlines: fall, summer, February 1.
- Application requirements: letter of intent and three letters of recommendation.
- Entrance examination: GRE general test. When taking GRE use institutional number R 4019. Application will not be considered without GRE scores.
- Prerequisite: (3 hours) ELdr 517 or Engl 316 or Ling 230 or 330.
- Foreign language and skill requirement: there are three options for completing this requirement depending on area of specialization: (A) instructional science specialization: equivalent of at least 18 hours

in statistics and computer science; (B) literacy education specialization: equivalent of at least 14 hours of statistics and computer science and reading ability in one foreign language; (C) second language acquisition specialization: equivalent of at least 14 hours of statistics and computer science and at least intermediate proficiency in a second foreign language, demonstrated by test or by course work completed through the 202 level. (This means that students must have two languages in addition to English to complete this specialization.)

Requirements for Degree.

- Credit hours (minimum 73): 55 course work hours plus 18 dissertation hours (IS 799R).
- Required courses (16 hours): IS 620 or Psych 560; IS 564, 652, 661, and 672 or Psych 500R or Ling 600.
- Specialization: 18 hours as determined in consultation with graduate committee.
- Internship: 12 hours (IS 680R).
- Three projects: 9 hours.
- Residence: at least two consecutive 6-hour semesters on the BYU Provo campus.
- Examinations: (A) comprehensive written examination; (B) oral defense of dissertation.
- Time limit: all requirements for the doctorate must be completed within an eight-year period.

FINANCIAL ASSISTANCE

Financial assistance is available mainly in the form of paid internships through the Instructional Science Department, other departments within the university, and various agencies external to the university. Limited funds are available for partial tuition waivers for students with emergency financial needs. Other financial aid is available through the university.

RESOURCES AND OPPORTUNITIES

Instructional science utilizes the David O. McKay Education Building

for the majority of its classrooms and resource centers.

The college and department provide extensive microcomputer and multimedia facilities for student use. Macintosh, MS-DOS, Windows, Amiga, and Apple IIGS computers are available in various computer laboratories. Most of these computers are connected to the university broad-band network, which provides convenient access to a large number of computer-based software tools, such as SPSS and SAS statistical analysis programs, the university library card catalog, the ERIC index, and the international INTERNET network.

The McKay Building's Learning Resource Center provides materials such as educational tests, curriculum guides, media kits, and audiovisual supplies.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

515R. Microcomputers in Schools. (1-3)

Applying computer technology in the public schools; evaluating educational software programs; using computer tools; computer programming in LogoWriter.

551. Introduction to Quantitative Reasoning. (3)

Introduction to statistical reasoning and methodology. Meaning and use of quantitative methods in answering substantive questions of educational research and practice. Using computer software packages.

560. Microcomputer Materials Production. (3)

Prerequisite: IS 286 or 515R (Microcomputers in Schools); CS 103 or equivalent.

Designing, programming, and debugging educational applications of microcomputers using a high-level computer language.

564. Instructional Design. (3)

Identifying instructional problems; specifying objectives, instructional strategies, and media; analyzing learning outcomes; developing instructional materials and assessment instruments; validating instructional systems.

620. Principles of Learning. (3)

Improving classroom learning through understanding underlying psychological principles and theories.

651. Quantitative Reasoning. (3)

Prerequisite: IS 551 or equivalent.

Use of analysis of variance and multiple regression/correlation in analyzing and interpreting results of educational research and evaluation.

652. Assessing Learning Outcomes. (4)

Prerequisite: Stat 552 or equivalent.

Selecting and constructing instruments and procedures for assessing affective, behavioral, and cognitive outcomes of education.

653. Measurement Theory. (3)

Prerequisite: Stat 501 or equivalent.

Classical and modern models for measuring human attributes. Issues related to reliability, validity, item selection, scoring, standard setting, and test equating. Use of item response theory and generalizability theory.

654. Computers in Educational Measurement. (2-4)

Prerequisite: IS 652 or instructor's consent.

Types of computerized measurement and assessment methods and item forms, as well as their development, delivery, and statistical theory.

657R. Measurement Project. (1-3)

Prerequisite: Stat 501 or equivalent.

Designing, conducting, and reporting a comprehensive measurement project.

660. Authoring of Interactive Video. (3)

Prerequisite: IS 560, 564.

Designing, developing, producing, and authoring intelligent, interactive video courseware. Budgets, project steps, equipment systems, and authoring.

661. Evaluation in Education. (3)

Nature, purposes, and functions of educational evaluation in making judgments about teachers, instructional materials, academic programs, curricula, and school systems.

662. Evaluation of Instructional Products. (2)

Prerequisite: Stat 552 or equivalent.

Formative and summative evaluation of replicable instructions/products and procedures.

663. Evaluation of Educational Programs and Curricula. (3)

Prerequisite: IS 661 or instructor's consent.

Problems in designing, conducting, and reporting the results of program and curriculum evaluations.

664. Advanced Instructional Design. (3)

Prerequisite: IS 564.

Advanced laboratory in instructional system design, production, formative evaluation, packaging, and implementation. Systematic critical analysis of all phases of development.

665. Instructional Visual/Video Production. (4)

Recommended: IS 286 or equivalent.

Designing, producing, and integrating audio, visual, and video instructional materials. Applying digital and other technologies in audio recording and mixing, and photographic and video production.

667R. Evaluation Project. (1-3)

Prerequisite: IS 661.

Designing, conducting, and reporting a comprehensive project in evaluation.

672. Empirical Inquiry in Education. (3)

Prerequisite: Stat 501 or equivalent.

Introduction to empirical research in education. Emphasizes designing, conducting, analyzing, reporting, and evaluating.

673. Research Synthesis and Conceptualization. (3)

Prerequisite: IS 672.

Survey of major research problems, questions, and theories that have been investigated in instructional science. Preparing critical, integrative synthesis of completed research; conceptualizing problems for further inquiry. Research prospectus required.

674R. Inquiry Methods. (1-3)

Prerequisite: IS 672 or instructor's consent.

Specific inquiry strategies for researching practical educational problems. Strategy studied varies from section to section.

- Naturalistic Inquiry in Education
- Quasi-Experimental Studies
- Cost-Benefit Analysis in Education
- Meta-Analysis
- Theory Building and Modeling in Education

677R. Research Project. (1-3)

Prerequisite: IS 672.

Designing, conducting, and reporting a comprehensive project in research.

680R. Internship. (1-6)

Prerequisite: departmental consent.

682. Project and Instructional Resource Management. (3)

Managing research, development, and evaluation projects in public schools and higher education. Planning, budgeting, supervising, managing personnel, and scheduling.

687R. Development Project. (1-3)

Prerequisite: IS 564.

Designing, conducting, and reporting a comprehensive project in development.

690R. Seminar. (1-3)

Check current class schedule for seminar topics.

692R. Advanced Topics. (1-3)

693R. Directed Individual Study. (1-3)

Prerequisite: instructor's consent.

698R. Master's Project. (1-6)

699R. Master's Thesis. (1-6)

760R. Advanced Computer-Based Instruction. (3)

Prerequisite: IS 560.

Current issues, research, and applications of computer technology in education. Advanced programming.

790R. Advanced Seminar. (1-3)

Check current class schedule for seminar topics.

799R. Doctoral Dissertation. (1-9)

Prerequisite: completion of skill and project requirements.

Formal report and defense of a substantive research topic designed to make an original contribution to knowledge in the field.

FACULTY

BUNDERSON, C. VICTOR, *Professor.*

PhD, Princeton University, 1965.
Computers in Measurement and Instruction.

BUNDERSON, EILEEN D., *Assistant*

Professor. PhD, Brigham Young University, 1983. Gender Issues in Science.

GREEN, EDWARD E., *Professor.* EdD,

Indiana University, Bloomington, 1972. Instructional Design.

HARRISON, GRANT V., *Professor.* EdD,

University of California, Los Angeles, 1969. Product Research.

INOUE, DILLON K., *Associate Professor.*

PhD, Stanford University, 1978.
Productivity in Learning.

MERRILL, PAUL F., *Professor.* PhD,

University of Texas, Austin, 1970.
Second Language Acquisition;
Computer Applications to Education.

OSGUTHORPE, RUSSELL T., *Professor.*

PhD, Brigham Young University, 1975. Research with Disabled Students.

SPENCER, ROBERT W., *Professor.* EdD,

Brigham Young University, 1971.
Computers in Education.

SUDWEEKS, RICHARD R., *Associate*

Professor. PhD, University of Illinois, 1978. Educational Measurement and Evaluation.

VAN MONDFRANS, ADRIAN P.,

Professor. PhD, University of Wisconsin, Madison, 1967.
Evaluation Theory and Practice.

WILLIAMS, DAVID D., *Associate*

Professor. PhD, University of Colorado, 1981. Naturalistic Evaluation; Research.

INTERNATIONAL AND AREA STUDIES

Director of Graduate Studies: Valerie M. Hudson

Graduate Subfield Coordinators:

American Studies: Neil York

Asian Studies: Paul Hyer

International Development Studies

Joint MA/MOB Program

Coordinator: Christopher B.

Meek

International Relations: Valerie M.

Hudson

Ancient Near Eastern Studies: Paul Y.

Hoskisson

International Business Joint

MBA/MA Degree Coordinator:

Lee Radebaugh

237 HRCB

PO Box 24538

Provo, UT 84602-4538

(801) 378-3560

THE PROGRAM OF STUDIES

David M. Kennedy Center for International Studies

The David M. Kennedy Center offers an interdisciplinary master of arts degree in international and area studies. Students select one of five different subfields of emphasis: American Studies, Asian Studies, International Development Studies, International Relations, Ancient Near Eastern Studies.

Course work is tailored to suit the student's individual interests and career direction, and the program is multidisciplinary. Each discipline is organized differently, but most have a flexible curriculum, with a core of required classes. Please contact the subfield coordinator for the curriculum of the subfield you have chosen.

Students with graduate degrees in international and area studies may pursue a wide range of careers, but the broad liberal arts background acquired as part of the MA degree is specifically designed to prepare for doctoral

or other advanced scholarly training. The MA is not designed to be a terminal degree. However, the joint degree programs can be considered as such.

One degree is offered through the David M. Kennedy Center for International Studies: International and Area Studies—MA. The one-year predoc-toral degree is for the subfields of American Studies, Asian Studies, International Relations, and Ancient Near Eastern Studies. Two joint degree programs also exist: the International Development—MA/MOB and the International Business—MA/MBA (subfields of International Relations or Asian Studies).

The program is extremely competi-tive, and enrollment is limited to twenty students per year. The predoc-toral MA program is to be completed in one calendar year of full-time study. The joint programs are approxi-mately two and a half years' duration.

DIRECTION OF THE GRADUATE PROGRAM IN INTERNATIONAL AND AREA STUDIES

The MA in international and area studies is a strong preparation for doc-toral study. It may also serve as a preparation for law or professional business schools. The MA may also serve to add an international dimen-sion to a technical or vocational gradu-ate degree, thereby giving the graduate who has international interests an edge in the career market. The MA is not, however, generally considered an ideal terminal degree. Placement in academic or international careers is highly competitive and often requires practical job skills or advanced aca-demic training in addition to the master of arts degree. Academic and career objectives should be carefully weighed to determine whether the MA degree will enhance graduate career opportunities.

Before applying, interested persons may make an appointment with the director of graduate studies to evalu-ate the usefulness of an international

and area studies degree for their career goals. Request general applica-tion information from the graduate secretary. Both persons can be reached at the David M. Kennedy Center, 237 HRCB, PO Box 24538, Provo, UT 84602-4538, telephone (801) 378-3378.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S and international). Admission is han-dled through the BYU Office of Graduate Studies. Application forms can be requested from Gradu-ate Admissions, B-356 ASB, PO Box 21341, Provo, UT 84602-1341. Appli-cants should complete all parts of the application form required by the university, with appropriate fees and transcripts, and indicate the de-partment as International and Area Studies, code 570168. The chosen subfield of emphasis should be en-tered on the application form where a major is requested.
- Application requirements: mini-mum GPA is 3.2. Joint degree pro-gram applicants must also be accepted by the Organizational Be-havior Department or the Marriott School of Management. Submit a statement of intent indicating past intercultural experience, career goals, current professional skills, and how degree will be applied. In-dicate probable topic of research for the thesis. Also submit three letters of recommendation from persons who can comment on applicant's academic ability, motivation, and in-terpersonal skills. Before entry into the program, students are encour-aged to have had a meaningful in-ternational experience through participation in a university-sponsored program such as Study Abroad, the Washington Seminar, or an international internship. Check with subfield coordinator for subfield prerequisites.
- Entrance examination: GRE general test. An official copy of the test scores must be submitted to Gradu-ate Admissions and scores should be indicated on part D of the appli-cation form. Prelaw applicants may submit LSAT. Concurrent MBA

applicants may submit GMAT; score subject to review. Interna-tional applicants: TOEFL required in addition to one of the preceding tests; minimum score of 580.

- Prerequisite: baccalaureate degree; undergraduate background in a relevant field, or satisfied defi-ciency; competency in a foreign lan-guage approved by committee chair. 16 undergraduate credit hours, including a 300-level conver-sation course, or other evidence of conversational fluency (foreign lan-guage not required for American Studies emphasis).

Requirements for Degree.

- Credit hours (32): thesis program (8 required, 18 electives, 6 thesis); for joint programs, contact subfield coordinator.
- Required course work: IAS 501R (fall and winter), PLS 680 (fall), sub-field core readings seminar (fall), selected methodology seminar (fall or winter), IAS 699R (6 thesis hours, spring or summer). The subfield core readings seminar, the selected methodology seminar, and all elec-tives are to be determined in con-sultation with the subfield coordinator or the thesis advisor. There may be additional required courses for a particular subfield. Please contact subfield coordinator.
- International experience encour-aged: Study Abroad, Washington Seminar, international internship.
- Thesis.
- Examination: oral examination on course work along with oral de-fense of thesis.

FINANCIAL ASSISTANCE

The financial aid application deadline is February 1. The following financial aid is available: supplementary awards, which pay full or partial tui-tion for qualified students, awarded on the basis of academic standing; re-search assistantships, paid positions requiring from five to ten hours of work per week; and research grant monies, awarded on the basis of pro-posal merit and topic.

COURSE DESCRIPTIONS

501R. Graduate Colloquium. (1)

Methodologies and reading. Preparation for writing competency requirements and research paper presentation. Required of all international and area studies master's candidates. Studies based on individual and program needs.

599R. International Internship. (1-9)

Professional-level internship in an international setting. Class must be coordinated through Study Abroad.

695R. Directed Individual Studies. (1-3)

697R. Seminar in International Studies. (1-3)

699R. Master's Thesis. (1-6)

FACULTY

See faculty listings under the following catalog entries:

- Anthropology
- Asian and Near Eastern Studies
- Economics
- Marriott School of Management
- Organizational Behavior
- Political Science
- Sociology

LANGUAGE ACQUISITION

Graduate Coordinator: Randall Lund

4088 JKHB
PO Box 26104
Provo, UT 84602-6104
(801) 378-4961

THE PROGRAM OF STUDIES

The College of Humanities offers one collegewide degree in language acquisition: Language Acquisition—MA.

Generally not more than two students per language are admitted to the language acquisition program per year. Most students complete the degree within two years.

Language Acquisition—MA

This program offers professional preparation to students seeking careers in applied linguistics, foreign language education, computer-assisted language learning and instruction, and other related areas.

Students become familiar with current theories of second language acquisition and develop basic skills in applying that knowledge to teaching, testing, and classroom-oriented research in their language of specialization.

The program is quite flexible, with emphases varying according to students' interests and faculty members' expertise. It is ideally suited to the needs of the following types of students:

- Students who have completed undergraduate majors in foreign languages, applied linguistics, or related fields, and who are contemplating eventual careers in academics.
- Foreign language teachers at the secondary school level who wish to further their professional education and acquire more specialized competency in their fields.
- Students seeking the necessary preparation for advanced research

and work in the field of high-technology applications to language learning and instruction.

Students are admitted to the program with a specific language specialization in Arabic, Chinese, Finnish, French, German, Japanese, Korean, Portuguese, Russian, or Scandinavian.

Admission and Entry.

- Application deadline: February 1 (U.S. and international).
- Application requirements: entrance examination is GRE general test; fifteen-minute interview in the language of specialization addressing applicant's academic goals. May be completed in person, by telephone, or on tape in conversation with a second party.
- Sample of student's scholarly writing.
- Prerequisite: baccalaureate degree and strong background in the language of specialization.

Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours (699R).
- Required courses: Ling 540, 600, 641, 660, 677.
- Elective courses: 3 hours of advanced linguistic study of the language of specialization, plus 9 hours as approved by the graduate committee for a total of 12 hours.
- Language requirement: reading and speaking ability (202 level) in language other than English in addition to language of specialization.
- Thesis: 6 hours of 699R in language of specialization.
- Examination: oral defense of thesis.

FINANCIAL ASSISTANCE

Full or partial tuition assistance is available, depending on merit. Applicants should contact the respective language department directly to apply for a teaching assistantship. Limited funds are also available for participation in professional conferences.

RESOURCES AND OPPORTUNITIES

Humanities Research Center. Students in the language acquisition program utilize the Humanities Research Center for world-class computer-assisted language instruction and translation.

The Foreign Language Student Residence. Students who desire a more intensive language study experience and practical application of the language under the direction of faculty and native residents may apply to live in the Foreign Language Student Residence. All activities in the individual apartments in the residence are conducted in the foreign language. Housing is available for men and women in the languages of specialization. Graduate students may participate as students or as senior residents.

For a more detailed description of the graduate program requirements, send for a copy of the degree bulletin.

COURSE DESCRIPTIONS

See course descriptions under Linguistics section of this catalog and desired area of specialization.

FACULTY

Over thirty faculty members are associated with the program and are available for consultation, although the primary advisor is usually associated with the language of specialization. See faculty names and research interests under both the Linguistics section of this catalog and the various language departments.

LAW

Dean: H. Reese Hansen
Associate Dean: J. Clifton Fleming, Jr.
Associate Dean: Constance K. Lundberg
Associate Dean and Graduate Coordinator: Scott W. Cameron
Assistant Dean: Kathy D. Pullins

342 JRCB
 PO Box 28001
 Provo, UT 84602-8001
 (801) 378-6386

THE PROGRAM OF STUDIES

J. Reuben Clark Law School

Students admitted to the highly competitive programs of the Law School receive a breadth and depth of training that prepares them to function in the wide range of activities that occupy the professional lawyer's life. Students gain firsthand experience with a variety of teaching and learning methods, among them Socratic or inductive teaching, problem solving, seminars, individual research, and clinical experience.

The specific objective of the curriculum is to maximize the student's mastery of legal reasoning and legal method—in addition to teaching a core of the basic substantive rules of law and imparting an appreciation for its institutions and traditions.

Students are taught to analyze complex factual situations; to separate the relevant from the irrelevant; and to reason inductively, deductively, and by analogy. Students are also schooled in the arts of written and oral advocacy.

Legal education at this school does not include the sponsorship of particular political objectives, except as may flow from loyalty to the United States Constitution and from a commitment to the highest ideals of personal character and individual liberty. These

make up the foundation upon which an enduring legal system must rest.

Two degrees are offered through the J. Reuben Clark Law School: Law—JD and Comparative Law—LLM. The university has also approved programs whereby qualified students can obtain a concurrent master's degree in business administration, public administration, accountancy, organizational behavior, or education or a doctorate in education while pursuing a law degree.

The Law School selects approximately 150 students each year for admission to the new class. The juris doctorate (JD) takes three years (six regular semesters) in residence to complete. The LLM students receive their degree on completion of 24 credit hours earned during at least two semesters in residence.

Law—JD

The J. Reuben Clark Law School offers a six-semester course of graduate professional study leading to the juris doctorate (JD) degree. Additional information about legal education, admissions standards, and procedures—including information about the Law School Admission Test (LSAT) and registration with the Law School Data Assembly Service (LSDAS)—can be obtained from the J. Reuben Clark Law School Bulletin, which is available through the admissions office of the Law School.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 15. (Admissions are for fall semester only.) By the posted deadline, all parts of the completed application must have been received by the Law School Admissions Office, 340 JRCB, PO Box 28000, Provo, UT 84602-8000. To be considered complete, application must include the following:
 - Completed official Law School application form.
 - Check or money order for \$30 payable to Brigham Young University. (This is an application fee and

is neither refundable nor credited toward tuition.)

—Two completed evaluations from undergraduate teachers and one from a supervisor of work or service (including church, military, or other) on Prospective Law Student Evaluation Forms included in the official application.

—Report of the applicant's interview with an LDS bishop, branch president, or mission president; religious leader of another faith; or judge of a court of general jurisdiction indicating the applicant's willingness to comply with the BYU Honor Code and standards of conduct.

—LSDAS Law School Report that includes transcripts and LSAT scores.

—A personal statement.

- Application requirements: to be admitted to the Law School, an applicant must be a college graduate who has excelled academically and has scored in the upper range of the nationally administered LSAT. In addition, applicants must meet the general university admission requirements, including the personal standards required of all students.
- Prerequisite: a bachelor's degree is required to ensure that the entering student has the soundest possible foundation for the study of law. Because the study of law ranges so broadly, no specific undergraduate major is required. The greater the student's diversity with the human experience, the better.
- Skills: ability to analyze, reason, read carefully, think in abstract terms, and express thoughts clearly and precisely.

Requirements for Degree.

- Credit hours (90): credits toward the JD degree must be earned by the end of ten regular BYU Law School semesters (five years) after a student has begun the study of law at an ABA-approved law school.
- Required courses: all first-year courses are required for graduation: Torts I and II, Contracts I and II, Civil Procedure I and II, Criminal Law, Property I and II, Legal

Writing I and II, Public Interest Law. Each student will then be required to take the professional responsibility course during the second or third year.

- Ethics requirement: first-year students must attend the series of videotaped presentations raising ethical issues.
- Legal paper: each student will be required to prepare, during his or her second or third year, a substantial paper of satisfactory quality.
- Legal research training: each student must complete ten days of legal research training before graduation.
- Residency requirement: graduation requires six regular semesters in residence. Enrollment in summer programs (ten semester hours spread over two summers) can reduce the number of regular semesters from six to five.
- Graduation interview: to be held with the director of student records and services four months prior to graduation.

Comparative Law—LLM

The J. Reuben Clark Law School created the Master of Law (LLM) Program in 1988 to provide an opportunity for lawyers trained in jurisdictions outside the United States to engage in a comparative study of the U.S. legal system with that of their home country. The program provides maximum exposure to the U.S. legal system and frequent interaction between master of law students and students seeking the juris doctorate degree. Students obtain a solid foundation in the basic principles of United States law while being allowed the flexibility to pursue personal academic interests. To ensure a superior educational experience for students in the program, admission is limited to eight applicants per year.

The master of law (LLM) degree is conferred upon successful completion of a minimum 24 credit hours earned during at least two semesters in residence following completion of a JD

degree or its equivalent outside the United States.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 15. (Admissions are for fall semester only.) By the posted deadline, all parts of the completed application must have been received by the Law School Admissions Office. To be considered complete, the application must include the following:
 - Completed application on the official Law School application form.
 - Check or money order for \$30 payable to Brigham Young University. (This is an application fee and is neither refundable nor credited toward tuition.)
 - Three completed evaluations from (1) two faculty members who taught the applicant in law school courses and (2) one other person who has supervised the applicant's academic or professional work or service.
 - Report of the applicant's interview with his or her bishop, clergy, or judge of a court of general jurisdiction indicating the applicant's willingness to comply with the BYU Honor Code.
 - Official transcripts of the applicant's academic record listing courses and corresponding grades and, if available, a statement of rank in class, the size of the class, and an explanation of the grading system used by the school. The official transcript and statement of rank must be submitted in English.
 - If English is not the applicant's native language, reports of the TOEFL and TSE reports. A TOEFL score of at least 590 is required for admission to the program. If an applicant's TOEFL score is inadequate, he or she may be considered for conditional acceptance subject to successfully completing an intensive language course in an American university prior to beginning the program.
 - Written statement explaining the applicant's reasons for wanting to pursue postgraduate studies in law and the applicant's career plans.

—Official verification of admission to the practice of law in the applicant's native country.

—Proof of the applicant's financial capability to be self-supporting while enrolled in the Law School.

- Application requirements: an applicant for admission to the LLM program must have completed either a period of law study at least substantially equivalent to that required of a graduate of an ABA-approved law school in the United States or another course of law study that has adequately prepared the student to pursue an LLM degree. The applicant must have completed the educational requirements for admission to the practice of law in his or her native country. In addition, applicants must meet the general university admission requirements, including the personal standards required of all students.

Requirements for Degree.

- Credit hours (24): credits toward the LLM degree must be earned during at least two regular BYU Law School semesters following completion of a JD degree or its equivalent outside the United States.
- Required courses: each student will be required to complete the 3-credit-hour Introduction to American Law course during the fall semester. (A student may satisfy this requirement during the summer preceding his or her enrollment at BYU by completing an introductory course for foreign students at the following schools: Georgetown, Florida, Wisconsin, or the University of Texas at Dallas.) Additionally, each student is required to complete two semesters in one of the regular first-year courses in the JD program. The course chosen to fulfill this requirement is determined by the student in consultation with his or her faculty-appointed advisor.
- Legal research training: each student must complete the legal writing and research course related to the first-year course selected.
- Written thesis: a student may earn up to 4 credit hours for a written thesis project supervised by an

appointed thesis advisor and defended before that advisor and two additional readers. Although the written thesis is encouraged, it is not required for completion of the LLM degree.

- The student chooses the remainder of his or her curriculum from the regular juris doctor course offerings.

Joint Master's Degrees— JD/MBA, JD/MPA, JD/MAcc, JD/MOB

Joint degrees with the JD are offered in business administration, public administration, accountancy, and organizational behavior in a duration of four academic years. The law program is ordinarily three years; the other programs are two. The four-year combination is possible because of subject areas of common interest to the programs. The first year is ordinarily spent in the Law School, the second year is devoted to the first two semesters of regular MBA, MPA, MAcc, or MOB programs, and the last two years are arranged to suit individual needs above the core requirements. Further inquiries can be sent to the Law School or to the Marriott School of Management (for MBA, MPA, MAcc, and MOB programs). Address MSM correspondence to Marriott School of Management, 730 TNRB, PO Box 23113, Provo, UT 84602-3113.

Note: Students entering one of the joint programs must meet the admission requirements of each degree.

Joint Education Degrees— JD/MEd, JD/EdD

The Law School and the College of Education have established the joint JD degree and either a master of education or a doctor of education. The Law School will accept 6 hours of credit obtained in the master's program, or 9 hours of credit obtained in the doctoral program toward the JD degree. Direct inquiries to the Law School, not the College of Education.

Note: Participants must meet the admission standards of each degree.

Joint Programs—JD/Master's

In special cases the Law School will accept credit earned in other graduate programs offered by the university. The Law School has details about specific programs.

FINANCIAL ASSISTANCE

A number of scholarships and endowed awards are available to law students, as well as a variety of low-interest loans. Students interested in these opportunities should inquire at the Law School and the BYU Financial Aid Office.

Tuition and Fees. Tuition and fees must be paid before or at the time of registration. Since more than 50 percent of the cost of operating the Law School comes from the tithes of The Church of Jesus Christ of Latter-day Saints, students and the families of students who are tithe-paying members have already made a significant contribution to the university and are thus charged a lower tuition fee than nonmembers. This disparity is similar to the higher tuition charged by law schools of state universities to nonresidents.

Semester tuition:	\$2,300 LDS
	\$3,450 non-LDS

RESOURCES AND OPPORTUNITIES

J. Reuben Clark Law Building. One of the finest university law school facilities in the country, the J. Reuben Clark Law Building is attractively located on the eastern edge of the campus. Its five floors house nine classrooms, three seminar rooms, a student commons area, a student lunchroom, and ample spaces for student organizations and activities, as well as faculty offices and a law library.

Howard W. Hunter Law Library. Ranking now among the nation's

larger law libraries, the Howard W. Hunter Law Library contains more than 400,000 volumes or equivalents available for student and faculty use. Besides the latest in technological facilities and services, the library also contains individual study carrels with hookups for computer access to networks. Law students also have access to the holdings in the university library, the Harold B. Lee Library.

Cocurricular Programs. In addition to the Brigham Young University Law Review, law students publish the BYU Journal of Public Law and the Brigham Young University Education and Law Journal and participate in board of advocates and trial advocacy programs. The cocurricular programs extend law review experience to a larger number of students than would be possible through a single journal.

Other Special Programs. Students obtain experience in trial and appellate practice patterned after the old English Inns through the American Inn of Court I. Minority students may participate in annual summer institutes sponsored by the Council on Legal Education Opportunity and a scholarship program in law for American Indians funded by the Bureau of Indian Affairs.

Student Organizations. Within the Law School, students may participate in a number of organizations, among them the Student Bar Association, the Women's Law Forum, the Diversity Committee, the Minority Law Students Association, the Native American Law Students Association, the Natural Resources Law Forum, the Family Law Society, the Alternative Dispute Resolution Society, the Government and Politics Legal Society, the International and Comparative Law Society, the Intellectual Property Law Association, the Public Interest Law Foundation, the Federalist Society, and the Civil Rights Law Association. There is a chapter of a legal fraternity on campus and a Law Partners organization for spouses of married law students.

For a more detailed description of the graduate program requirements, send for a copy of the J. Reuben Clark Law School Bulletin.

COURSE DESCRIPTIONS

Note: Each course may not be offered each year.

505 and 506. Torts 1 and 2. (3 ea.)

A study of the judicial process in civil actions for damages or equitable relief for physical, appropriational, and defamatory harms to personality, property, and relational interests. Some consideration is given to alternative reparation systems such as workers' compensation and "no-fault" automobile insurance plans.

510 and 511. Contracts 1 and 2. (3 ea.)

An examination of the kinds of promises that are enforced at law, and the nature of the protection given. Inquiry will be made into the formation, performance, and discharge of contracts; their assignment, termination, and modification; and the variety, scope, and limitations on remedies. Attention will be given to Article Two of the Uniform Commercial Code.

515 and 516. Civil Procedure 1 and 2. (3 ea.)

A basic study of the operation of courts, including an introduction to the organization of state and federal courts and relationships between them. Among topics studied will be jurisdiction over persons, things, and subject matter; venue; the scope of litigation as to claims, defenses, and parties; pleading, pretrial motions, discovery, and pretrial conferences; trials and the functions of judges, juries, and lawyers; appeals and the role of appellate courts; and the enforcement and finality of judgments and decrees.

520 and 521. Property 1 and 2. (3 ea.)

An inquiry into the nature of "property" and "ownership" of land and structures on land, and the ways in which ownership may be established, restricted, transferred, and divided among various persons.

525. Criminal Law. (3)

A review of problems in defining what conduct should be subjected to criminal penalties; the limitations of criminal law as a means for prevention and control of undesirable conduct.

535 and 536. Legal Research and Writing 1 and 2. (1.5 ea.)

A study of the fundamentals of good legal research, proper legal citation form, basic principles of legal analysis, elements of good writing style, legal memorandum drafting, appellate brief writing, and appellate advocacy. Actual research and writing exercises are key components of the course.

537. Legal Research 1. (0.5)

Prerequisite: admission to Law School

Study of fundamentals of legal research and legal citation format. Introduces primary and secondary source materials. Effective methods for accessing and updating sources.

538. Legal Research 2. (0.5)

Prerequisite: Law 537.

Concentrates on electronic legal research. Basic training on full-text legal research databases such as WESTLAW and LEXIS. An introduction to accessing legal materials using CD-Rom and the INTERNET.

541. Public Interest Law. (2)

A study of lawyers' responsibilities and opportunities to use their specialized training to assist members of the public who are not adequately represented, including an examination of various legal issues commonly encountered in pro bono and public interest work. The course will help students prepare themselves to meet these vital legal needs.

599R. Externship. (Arr.)

- Legal Services
- Externship
- Pro Bono
- Cooperative Education

602. Administrative Law. (3)

An examination of the administrative process. The course examines why administrative agencies are created, how they obtain and use information, what proceedings (rulemaking/adjudication) they can commence, and what controls over agency action (political/judicial) exist. The role of the attorney in this process is emphasized.

603. Criminal Procedure. (3)

An analysis of problems in administering a system of criminal law; constitutional and policy limitations on public officers in dealing with suspected, charged, and convicted offenders.

604. Advanced Legal Writing. (2)

Students will study and apply the techniques of sound writing that are most challenging for lawyers. Extensive writing, editing, and classroom participation are required. Students will produce a substantial paper.

605. Antitrust. (3)

The course will examine the development of legal doctrine under the Sherman Act and supplemental legislation, including price fixing, division of market, monopolization, mergers, tying and exclusive dealing arrangements, boycotts, and special relationships between principles of patent and antitrust law. Parallel attention will be focused on the relationships between principles of law and economics, examined in the context of certain key cases and the evidence in those cases.

606. Anglo-American Legal History. (2)

This seminar will survey the legal systems and values introduced to the British Isles by successive invasions up to the eleventh century. From the eleventh century to modern times, a single area of legal developments will be considered to discern the impact of historical forces and societal values on the course of those developments, especially the divergence of English and American rules.

607. Biblical Law. (2)

A comparative study of selected legal topics in the law codes of the Sumerians, Babylonians, Hittites, Assyrians, and Israelites, as well as legal cases in the Book of Mormon and the New Testament.

610. Business Associations. (3)

Prerequisite: first-year law courses.

Introduction to business associations, agency, uniform partnership acts, the essentials of corporate formation, shareholders rights, special problems of closely held businesses, preemptive rights, etc.

611. Advising Closely Held Business. (2)

Prerequisite: Law 641.

Advanced work in partnerships, corporations, and federal taxation in the context of business planning and counseling. Based on readings and problems that consider a broad range of matters commonly faced by lawyers who advise closely held businesses, including: drafting partnership agreements, determining whether and how to incorporate, organizing the closely held corporation and preparing basic corporate documents, counseling the owners of an ongoing corporate business, working with accountants and other professional business advisors, arranging business financing, getting earnings out of a corporate business, forming professional corporations, and avoiding common malpractice and ethical problems. Course grade will be determined from performance on a series of document-drafting exercises.

612. Advanced Corporation Law. (3)

Prerequisite: first-year law courses.

Introduction to financial accounting and corporate finance, William Act regulation and reporting, fiduciary duties owed in complex transactions, shareholder litigation, indemnification and insurance, etc.

615. Secured Transactions. (3)

This course is concerned with all aspects of security in personal property. (Personal property includes everything except land.) Covered are problems and legal principles relevant to the creation of the security interest, to its perfection, to priorities between competing security interests and between a security interest and other kinds of property interest, to payment and redemption, and to realization procedures. The emphasis will be on Article 9 of the Uniform Commercial Code.

616. Commercial Paper. (3)

A study of negotiable instruments (checks, drafts, notes) under Articles 3 and 4 of the Uniform Commercial Code, letters of credit, and electronic transfers.

618. Community Property. (2)

A study of community property: the basic concept and underlying policies; initiation and existence of a marital community; property capable of community ownership; classification of property as community or separate; and property management and control.

619. Conflict of Laws. (3)

An examination of jurisdictional issues, choice of law, and recognition of judgments in cases involving interstate and state-federal conflicts.

620. Constitutional Law 1. (3)

A study of the constitutional structure of the federal republic, including problems of judicial review, justiciability, sources of limitations upon national and state power, interstate commerce, taxing and spending, intergovernmental relationships within the federal system, separation of powers, and procedural and substantive due process protection of individual rights.

621. Constitutional Law 2. (3)

A study of the relationship between government and the individual, focusing on equal protection and constitutional restraints on private conduct.

623. Bankruptcy. (3)

Prerequisite: Law 615 prior or concurrently. Recommended: Law 610, 650 prior or concurrently.

An overview of consumer and business bankruptcies, reorganizations, bankruptcy procedure, and the bankruptcy court system.

625R. Evidence. (3 hours for M. Goldsmith's section, 4 hours for E. Kimball's section)

An examination of the law of evidence, including the principles governing the admissibility of evidence, the competency of witnesses, and the function of lawyer, judge, and jury in the presentation and evaluation of evidence.

626. Constitutional Law 3. (3)

Prerequisite: First-year law classes.

Course will begin with *Marbury v. Madison* and judicial review and then move to First Amendment issues.

628. Remedies. (3)

A study of the general principles and basic rules governing the rich inventory of remedies available through American courts. The principles associated with the law of remedies cut across substantive fields and guide the lawyer in fashioning or defending against various remedial schemes in any substantive context. The course emphasizes issues and developments of contemporary importance and includes public as well as private law remedies.

632. Family Law. (3)

An overview of state regulation of family relations, emphasizing marriage and divorce, adoption, child custody, regulating the ongoing family, and selected constitutional issues.

633. Children and the Law. (2)

Prerequisite: Law 632.

A study of issues relating to state regulation of parent-child relations, including children's rights, parent rights, juvenile courts, adoption, health decisions, educational decisions, child abuse and neglect, youth status offenses, and delinquency.

635. Federal Courts. (3)

The course explores fundamental structural questions regarding the powers of the federal judiciary in relation to other branches of the national government and to state governments and courts. It raises core constitutional issues of the separation of powers and federalism that are of current importance to all law students. In addition, it is a foundation course for those contemplating a litigation career.

640. Federal Taxation 1. (4)

A study of federal personal income tax, with an introduction to business and corporate income tax and federal tax procedure. Emphasis is placed on developing the student's ability to examine and understand statutory, judicial, and administrative tax law and to apply the law in solving specific problems.

641. Federal Taxation 2. (4)

Prerequisite: Law 640.

This course covers in detail the federal income tax consequences flowing from the creation, operation, merger, dissolution, and sale of partnerships and corporations and examines federal tax considerations bearing on the choice between conducting a business in partnership or corporate form.

642. Intellectual Property Law. (2)

The fundamental principles of patentability and infringement, including a brief discussion of employment and noncompetition agreements for protecting inventions. The class is not limited to students with scientific degrees or those intending to emphasize patent law, but it is a prerequisite to Advanced Patent Prosecution and Claim Drafting.

643. U.S. Taxation of International Income. (2)

Prerequisite: Law 640.

This course surveys the application of the federal income tax to foreign income of U.S. citizens and residents and to the U.S. source income of foreigners. It also introduces students to the purpose and operation of income tax treaties.

644. Insurance Law. (3)

The major topics for lawyers include types of insurance, presenting claim, interpreting the insurance contract, measures of recovery, rights to proceeds of insurance, potential defenses by the insurer, and rights and obligations of insurers and the insured.

645. Federal Indian Law. (3)

Prerequisite: First-year law classes.

A study of the law of the federal government and the states respecting Native Americans and their land. The course will consider the relationship of European discoverers and Native Americans during the Colonial period; Native American treaties, executive orders, and agreements; changing United States policy respecting Native Americans; federal, state, and tribal jurisdictions, civil and criminal; tribal courts; Native American hunting and fishing rights, water rights, and civil rights.

648. Workers' Compensation. (2)

An examination of the substance and procedure of workers' compensation law. Consideration given to coverage of the workers' compensation system; medical, disability, and death benefits; and administration of the system, including integration of workers' compensation with other accident benefits systems.

649R. Clinical Programs. (10)

Prerequisite: first-year law courses.

650. Real Estate Finance. (3)

A review of real estate finance transactions, including mortgages, trust deeds, installment sales contracts, other mortgage substitutes, receiverships, transfer of real estate security interests, discharge, deeds in lieu of foreclosure, foreclosure, foreclosure sales, redemption, deficiency payments, priorities, mechanics liens, judgment liens, purchase money mortgages, and ground leases.

651. Law and Literature. (3)

Course members will study literary and hermeneutic theory as they apply to the interpretation of the Constitution and cases decided thereunder.

652. Legislation. (3)

A study of the process by which policy is translated into statutory law and how that law is applied and interpreted, with emphasis on the legislative process, separation of powers, and statutory interpretation.

655. Labor Law. (3)

This course examines how collective bargaining relationships are established and how collective bargaining agreements are negotiated and administered in the private sector. The course also explores the use of economic weapons, e.g., strikes, boycotts, and picketing.

656. Public Lands and Natural Resources. (3)

This course surveys the field of natural resources law in the context of federal public lands. Topics covered include public land, law, water, hard-rock minerals, oil and gas leasing, timber, grazing and range management, wildlife, recreation, and environmental law. The current political controversies surrounding energy development and land use restrictions give rise to special concerns with this topic throughout the western states.

658. Land Use Planning. (3)

Public and private limitation imposed upon and positive assistance provided for the use of private and public real estate. Includes land use politics, administration, control, regulation, zoning, subdivisions, annexations, regulations, eminent domain, conservation, preservation, development, housing, economics, finance, and taxation. Emphasis is placed on the fact that land use planning, control, and assistance involve public and private activities and action.

659. Public International Law. (3)

Nature of international law; bases of state jurisdiction; law of sea; law of air space; sovereign immunity; the individual in the international legal system; statehood and recognition of states; diplomatic and consular protection and immunity; international agreements.

660. Professional Responsibility. (2)

A study of the ethical and professional responsibilities of practicing lawyers. Primary focus is on the Model Rules of Professional Conduct.

661. Public Policy Negotiations. (3)

This seminar emphasizes the application of negotiation theories and skills to civil rights issues and public law conflicts. It is designed for those students pursuing careers in public interest law, poverty law, or a public policy-oriented practice (e.g., environmental, education, housing, health care).

662. Securities Regulation. (3)

Recommended: Law 610.

A study of the Securities Act of 1933, the Securities Exchange Act of 1934, state blue sky laws and regulations, the distribution and trading of securities, express and implied civil liabilities, criminal liability, insider trading, tender offers, broker-dealer regulation, and liability of collateral participants and professional advisors.

663. State and Local Government 1. (3)

A study of the interrelationship among national, state, and local governments and the powers of each, as well as an examination of separation-of-powers principles and the impact of the political process at the state and local level.

666. Wills, Decedents' Estates, and Trusts. (4)

An examination of the legal framework of private and charitable trusts as vehicles for the donative disposition of personal wealth and a study of family wealth transmission problems, intestate succession, wills and will substitutes, and the probate process.

668. Legal Negotiation and Settlement. (3)

The theory and practice of negotiation. During the first four or five weeks, the emphasis is on learning (1) the functions of negotiation in the professional life of lawyers, (2) the negotiating skills and patterns of practicing lawyers (based upon empirical research and careful in-class analysis of videotapes of attorneys engaged in various negotiating situations), (3) the meaning and purposes of negotiations from the client's perspective, (4) some of the dynamics of negotiation as experienced during in-class group negotiating exercises, (5) why persons cannot be better negotiators than they are human beings, and (6) why development as a negotiator is a lifelong process. During the remainder of the semester, class members prepare and negotiate approximately eight cases and transactions, including small and large cases in litigation as well as non-conflict-based business and commercial transactions.

670. Advanced Real Estate Transactions. (2)

Prerequisite: Law 650.

The development and financing of subdivisions, condominiums, and income properties, as well as the impact of bankruptcy on real estate ownership and financing.

671. Oil and Gas. (2)

The course will include coverage of the following: the nature of interests in oil and gas, the oil and gas lease and associated problems, title and conveyancing problems with respect to transfers of oil and gas interests, and pooling and unitization.

674. Law Practice Management. (2)

Practice development, financial management, partnerships and other arrangements for law offices, setting fees, management of the law library, legal and nonlegal personnel, allocation of compensation.

675. Advanced Torts. (2)

A study of tort actions and remedies for injuries to business, family, and political interests, including unfair competition, interference with contract, wrongful death and survival actions, loss of consortium, criminal conversation, alienation, malicious prosecution, abuse of process, and civil rights actions.

679. Alternative Dispute Resolution. (2)

Prerequisite: Law 668.

The theory and practice of dispute resolution, with a primary focus on mediation, arbitration, and the various "hybrids" such as mini-trial, summary jury trial, and innovative uses of third-party neutral experts. The class focuses on the information lawyers need for advising their clients about the pros and cons of these processes and the skills lawyers must have to competently participate in them.

680. State and Local Government 2. (3)

Recommended: Law 663.

A study of trends and perspectives in state and local government, with emphasis on state and local control over, and federal limitation on, licensing, land use, and taxation, as well as state and local governmental liability under federal civil rights statutes.

681. Federal Estate and Gift Tax. (2)

Prerequisite: Law 666.

An examination of the federal estate and gift tax, including basic estate-planning concepts.

684. Water Law. (2)

Consideration of state, federal, and international law respecting water resources allocation, development, management, and conservation. All students will be required to prepare a substantial paper on transboundary shared water resources regulation.

685. Introduction to American Law. (3)

A survey of basic concepts and institutions in the American legal system. The survey is designed for persons who have received their law degree or its equivalent from a university outside the United States.

695R. Law School Seminar. (Arr.)

- Professional Seminar
- Hazardous Materials Law
- Real Estate Development
- Advanced Legal Research
- The Defense Function
- Legal Interviewing and Counseling
- Computer-Based Practice Systems in Law
- In-Class Utah Legal Services Seminar
- In-Class Externship/Pro Bono Seminar
- Civil Trial Practice
- Constitutional Law 3
- International Institutions
- Lender Liability
- Business Associations
- Law and Religion
- Origins of the Constitution
- Poverty-Based Immigration Law
- Federal Courts 1 and 2
- Selected Issues in Employment Law
- Selected Issues in International Business Transactions
- The Law of Air Pollution Control
- The Supreme Court
- Conservation Law
- Complex Litigation
- Entertainment/Sports Law
- Introduction to European Union Law
- RICO Law
- American Education Law and Policy
- Immigration Law

696R. Law School Seminar. (Arr.)

- Professional Seminar
- Collective Bargaining
- State Constitutional Law
- Business Reorganization Under the Bankruptcy Code
- Planning, Negotiating, and Drafting Commercial Transactions

- Legal Interviewing and Counseling
- Advanced Computer-Based Practice Systems in Law
- In-Class Utah Legal Services Seminar
- In-Class Externship/Pro Bono Seminar
- Civil Trial Practice
- Advanced Estate Planning
- Products Liability
- Comparative Church and State
- Advanced Comparative Law
- Construction Law
- Advanced Patent Prosecution and Claim Drafting
- Federal Courts 1 and 2
- Disability Law
- Selected Topics in European Union Law
- Employee Benefit Plans
- Philadelphia 1787 Revisited
- Social Policy and Feminist Legal Thought
- North American Free Trade Agreement
- Biomedical Ethics and Law
- Unfair Trade Practices
- Comparative Constitutional Law
- Human Rights Law
- Advanced Negotiation
- Trademark and Copyright Law
- Problems in Legal Philosophy

699R. LLM Thesis. (Arr.)**FACULTY**

ADAMS, KIF AUGUSTINE, *Assistant Professor*. JD, Harvard, 1992. Torts, International Law.

BACKMAN, JAMES H., *Professor*. JD, University of Utah, 1972. Land Use Planning; Real Estate Transactions; Real Property.

BURNS, JEAN WEGMAN, *Professor*. JD, University of Chicago, 1973. Antitrust; Commercial Law; Conflicts of Laws.

DOMINGUEZ, DAVID, *Professor*. JD, University of California, Berkeley, 1980. Criminal Law; Negotiations; Labor Law.

DURHAM, W. COLE, JR., *Professor*. JD, Harvard University, 1975. Comparative Law; Constitutional Law; Criminal Law.

ECHOHAWK, LARRY, *Professor. JD*, University of Utah, 1973. Criminal Law, Public Lands and Natural Resources, Professional Responsibility.

FARMER, LARRY C., *Professor. PhD*, Brigham Young University, 1975. Computer-Based Expert Systems in Law Practice; Law and Behavioral Science; Legal Interviewing and Counseling.

FLEMING, J. CLIFTON, JR., *Professor. JD*, George Washington University, 1967. Business and Corporate Finance; Estate Planning; Federal Taxation.

FLOYD, C. DOUGLAS, *Professor. LLB*, Stanford University, 1967. Civil Procedure; Federal Courts; Antitrust.

GEDICKS, FREDERICK M., *Professor. JD*, University of Southern California, 1980. Law and Religion; Constitutional Law; Legal Theory.

GOLDSMITH, MICHAEL, *Professor. JD*, Cornell University, 1975. Criminal Law; Criminal Procedure; RICO.

GORDON, JAMES D., III, *Professor. JD*, University of California, Berkeley, 1980. Contracts; Securities Regulation.

HAFEN, BRUCE C., *Professor. JD*, University of Utah, 1967. Constitutional Law; Education Law; Family Law.

HANSEN, H. REESE, *Professor. JD*, University of Utah, 1972. Director, Clinical Studies. Wills; Estates and Trusts; Estate and Gift Tax.

LEE, REX E., *Professor. JD*, University of Chicago, 1963. Antitrust; Appellate Advocacy; Constitutional Law.

LUNDBERG, CONSTANCE K., *Professor. JD*, University of Utah, 1972. Environmental Law; Federal Courts; Natural Resources.

NEELMAN, STANLEY D., *Professor. JD*, University of Denver, 1972. Wills and Estates; Taxation.

PRESTON, CHERYL BAILEY, *Professor. JD*, Brigham Young University, 1979. Debtor-Creditor Rights; Gender and Law; Commercial Law.

RASBAND, JAMES R., *Associate Professor. JD*, Harvard, 1989. Torts, Water Law.

THOMAS, DAVID A., *Professor. JD*, Duke University, 1972. Federal Jurisdiction; Legal Bibliography, History, Research, and Writing; Real Property.

WARDLE, LYNN D., *Professor. JD*, Duke University, 1974. Biomedical Ethics and Law; Conflict of Laws; Family Law.

WELCH, JOHN W., *Professor. JD*, Duke University, 1975. Agency and Partnerships; Corporate Finance; Federal Taxation.

WHITMAN, DALE A., *Professor. LLB*, Duke University, 1966. Property; Real Estate Finance; Land Use Planning.

WILKINS, RICHARD G., *Professor. JD*, Brigham Young University, 1979. Antitrust; Civil Procedure; Federal Courts; Constitutional Law.

WILLIAMS, GERALD R., *Professor. JD*, University of Utah, 1969. Office Practice; Remedies; Legal Negotiation and Settlement.

WOOD, STEPHEN G., *Professor. JD*, University of Utah, 1969; JSD, Columbia University, 1980. Administrative Law; Employment Law; International Business Transactions.

WORTHEN, KEVIN J., *Professor. JD*, Brigham Young University, 1982. Torts; Environmental Law.

LINGUISTICS

Chair: John S. Robertson
Graduate Coordinator: Lynn E. Henriksen

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 Provo, UT 84602-6278
 (801) 378-2937

THE PROGRAM OF STUDIES

The Department of Linguistics has two primary academic thrusts: a master's program in linguistics and a master's program in teaching English as a second language (TESL). The graduate programs have seen constant growth over the years, partly owing to the intrinsic interest that the study of language holds, and especially because of the unrelenting, worldwide demand for learning English as a second language. The two departmental emphases are complementary in the sense that one emphasizes the linguistic theory and the other focuses on applications of linguistic theory, especially with regard to language learning.

The direction of the department has been constant over the past years: to provide professional training not only in linguistic theory but also in applications of that theory, with a special emphasis on learning English.

Two degrees and one certificate are offered through the Department of Linguistics: Linguistics—MA; TESL Graduate Certificate; and TESL—MA.

In addition to the above, the department is responsible for the following academic programs: Native American Languages, Austronesian Languages, Welsh, and American Sign Language.

Linguistics—MA

The purpose of the linguistics MA program is closely related to the department's definition of linguistics, which is the scientific study of language. The program aims to prepare the student

to become a professional, prepared to go on to a PhD program if desired, or to go into the world as a competent practitioner of the skills expected of a linguist. A more applied, but popular emphasis in the department is a track that combines linguistic with computer skills. The education received includes such skills as analyzing language in its phonology, morphology, syntax, and semantics. It also introduces the student to such fields as sociolinguistics, anthropological linguistics, and especially computers and language if the student chooses to take that track. There are currently eleven graduate students enrolled. Students average 2.4 years for completion.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer; February 1 (U.S. and international).
- Entrance examinations: for international applicants, the Departmental English Proficiency Exam and TOEFL, with a minimum score of 580.
- Prerequisite: Ling 330; high-competency (301 level or higher) in one foreign language, plus 12 credit hours in a second foreign language (one of these foreign languages must be non-Indo-European) or 12 credit hours in approved computer science courses; ESL 404 is required of all nonnative English speakers.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Ling 699R).
- Required courses: Ling 450, 500, 521, 535, 540, 550, 630, 690, 699R, plus one 321-level foreign language class.
- Thesis.
- Examinations: oral defense of thesis (consult department for details).

TESL—Graduate Certificate

The TESL Certificate (which differs from the state teacher certification) prepares the graduate to move into the TESL profession. There are currently twenty-five graduate students

in the TESL Certificate Program. The average time for completion is 1.35 years.

The graduate TESL program has been accepted by the Utah Board of Education as an accredited teaching major or minor for secondary education students. Those who have completed student teaching in an area other than ESL are still required to complete 2 hours of student teaching in English as Second Language (Ling 579).

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer; February 1 (U.S. and international).
- Entrance examinations: for non-native speakers of English: TOEFL, with a minimum score of 580; Departmental English Proficiency Exam. Any deficiencies in English skills must be remedied to the satisfaction of the department before moving into the TESL program.
- Prerequisite: Ling 230; ESL 404 is prerequisite for all nonnative English speakers. Both Ling 230 and ESL 404 should be completed before or during the first semester of course work.

Requirements for Certificate.

- Credit hours: minimum 18 course work hours after 3–6 prerequisite hours.
- Required courses: Ling 577, 579.
- Electives: 12 hours from Ling 500, 525, 531, 540, 555, 565R, 572, 573, 641, 660, 677, 678.

Teaching English as a Second Language—MA

The master's program in TESL has as its overall goal the preparation of students to become professionals in the field of English as a second language acquisition. Such study at the master's level provides appropriate preparation for further study at the PhD level, as well as success in the workaday world of teaching English as a second language. A graduate will be trained in teaching skills, teacher training, testing, writing, teaching reading, and scholarly research and

writing. There are currently eighteen graduate students enrolled, with an approximate average of 2.3 years for completion of the degree, including time in the TESL Certificate Program.

Admission and Entry.

- Application deadlines: application made upon completion of TESL Certificate (see below).
- Application requirements: applicants must petition the department and be accepted by a review board. Students should not register for 600-level course work until notified of acceptance into the MA program.
- Prerequisite: completion of graduate TESL Certificate; intermediate-level proficiency in a modern foreign language (language courses may be taken concurrently with ESL graduate courses); Ling 500 and acceptance of thesis prospectus; and evidence of graduate-level writing skills.

Requirements for Degree.

- Credit hours (37): minimum 31 hours (including 18 hours from TESL Certificate) plus 6 thesis hours (Ling 699R).
- Required courses: Ling 540, 600, 695.
- Electives: 6 hours chosen from Ling 420, 521, 525, 531, 535, 550, 551, 555, 565R, 571, 572, 600, 641, 677, 678, 679, Engl 529.
- Thesis.
- Final oral examination: defense of thesis.

Teaching Major*

Ling 230 or Engl 223, Ling 531, 540, 572, 577, and 18 hours from Ling 431, 500, 525, 550, 555, 571, 660, 677, 678, 679, 695, Engl 529.

*Only for students enrolled in TESL MA program.

Teaching Minor

Ling 230, 330, 531, 540, 572, 577.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

FINANCIAL ASSISTANCE

Financial assistance has been growing over the past several years, particularly in the form of tuition and partial tuition waivers; most recently as many as forty-five students have received such aid. One of the benefits that comes to both linguistic and TESL majors is the fact that many professors use research assistants, who at the present time number about twelve. Also, unique to the department for those majoring in TESL is the opportunity to become a teaching assistant or part-time teacher at the English Language Center, where there are about thirty-eight part-time teachers.

COURSE DESCRIPTIONS

500. Research Prospectus Design. (1)

Prerequisite: admission to language acquisition or linguistics MA program; or provisional admission to TESL MA program.

Procedures for developing research projects (including introduction and review of literature for MA thesis) Students may enroll concurrently for up to two hours of Ling 699R (thesis) credit.

521. Phonology. (3)

Prerequisite: Ling 330.

Discriminative values of speech sounds: their function in the communicative process. Analysis of phonological data via postulation of underlying forms and derivational rules.

525. Phonology of Modern English. (3)

Detailed phonetic and phonemic study of American English pronunciation, including theories and practices of teaching and acquiring pronunciation. Practicum included.

531. Grammar Usage. (3)

Examining English grammar and usage as they reflect different theories about language description and applying this knowledge in the ESL classroom. Practicum included.

535. Semantics. (3)

Prerequisite: Ling 330.

Theory and practice of semantic analysis with special emphasis on Jakobsonian and Peircian semiotics.

540. Language Acquisition. (3)

Prerequisite: Ling 330 or equivalent.

First- and second-language acquisition viewed in light of psycholinguistics and sociolinguistics.

550. Sociolinguistics. (3)

Research and theory in anthropological linguistics and sociolinguistics.

551. Anthropological Linguistics. (3)

Language in culture and society: development, typology, and description.

555. Teaching Culture. (3)

What culture is, how it affects language learners and teachers, development of U.S. lifestyle patterns. Variety of readings.

565R. Humanities Computing Project. (1-3)

Prerequisite: instructor's consent.

Major application or research project, working with instructor to do ongoing research or program development.

571. English as a Second Language K-12. (3)

Nature of language acquisition and strategies and materials designed to facilitate second language learning K-12.

572. TESL Reading and Writing. (3)

Nature of the processes involved in reading and writing, with special emphasis on helping ESL students develop these skills. Includes a limited teaching practicum.

577. Introduction to ESL Methodology. (4)

Survey of basic concepts, procedures, and techniques in second language teaching methodology and materials selection. Includes observation of actual ESL classes and a mentored ESL teaching practicum experience.

579. TESL Student Teaching. (2)

Prerequisite: Ling 577 and departmental consent.

580R. Problems in Linguistics and Applied Linguistics. (1-3)

Advanced research in language acquisition, sociolinguistics, psycholinguistics, linguistics field study, applied linguistics.

590R. Readings in Linguistics. (1-3)

Prerequisite: instructor's consent.

Individual study of current linguistic literature. Occasional discussion sessions with instructor and other class members. Pass-fail grade only.

599R. Cooperative Education. (1-9)

On-the-job experience under faculty supervision.

600. Research Design and Bibliography. (3)

Prerequisite: Ling 500.

Analysis of the options in research design for examining language teaching and acquisition; basic statistics; use of computers in language research.

630. Syntactic Theory. (3)

Prerequisite: Ling 430 or equivalent.

Theory of transformational grammar, emphasizing its history and recent extensions.

641. Interlanguage Analysis. (3)

Prerequisite: Ling 330 or equivalent.

Language as it relates to language acquisition and teaching, including contrastive analysis, error analysis, and discourse analysis.

660. Language Testing. (3)

Construction, analysis, use, and interpretation of language tests.

677. Advanced Methodology. (3)

Prerequisite: Ling 577 or equivalent.

Advanced ESL methodology and its classroom application.

678. Materials Development. (3)

Prerequisite: Ling 577.

Computer-assisted language materials development; evaluating and adapting texts, exercises, games, and supplementary teaching aids; developing tapes.

679. TESL Supervision-Administration Internship. (3)

Prerequisite: instructor's consent.

Actual fieldwork in TESL settings involving supervision, in-service training, and curricula-program study and administration.

690. Seminar in Linguistics. (2)

Prerequisite: Ling 630.

Advanced research and analysis of various linguistic problems.

695. TESL Seminar. (1)

Prerequisite: completion of majority of ESL courses; instructor's consent.

Integrating TESL theory and practice; refining thesis and publicly presenting and defending preliminary thesis.

699R. Master's Thesis. (1-9)

FACULTY

BAIRD, REY L., *Professor.* PhD, Indiana University, Bloomington, 1974.
General Linguistics.

BLAIR, ROBERT W., *Professor.* PhD, Indiana University, Bloomington, 1964. SLA; Sociolinguistics and Methodology.

BROWN, CHERYL, *Associate Professor.* PhD, University of California, Los Angeles, 1983. SLA; Discourse; Methodology; Research Design; TESL.

GRAHAM, CHARLES RAY, *Associate Professor.* PhD, University of Texas, Austin, 1977. SLA/Attrition; ESL; Spanish.

HALLEN, CYNTHIA, *Assistant Professor.* PhD, University of Arizona, 1991. Rhetoric; Lexicography; Philology.

HENRICHSEN, LYNN E., *Professor.* PhD, University of Hawaii, 1978. TESL; Methodology; Materials Development; EST.

LUTHY, MELVIN J., *Professor.* PhD, Indiana University, Bloomington, 1967. Phonology; Syntax; Finnish.

MANNING, ALAN, *Assistant Professor.* PhD, Louisiana State University, 1988. Linguistics Theory; Syntax.

MELBY, ALAN K., *Professor.* PhD, Brigham Young University, 1976. Computer Aids for Translators; Syntax; French.

ROBERTSON, JOHN S., *Professor.* PhD, Harvard University, 1976. Historical Linguistics; Semiotics; Mayan Languages.

SCOTT, MARY LEE, *Assistant Professor.* PhD, University of California, Los Angeles, 1989. Applied Linguistics; Testing; Language Acquisition.

SHELLEY, MONTE F., *Assistant Professor.* PhD, Brigham Young University, 1983. Text Retrieval and Analysis; Instructional Science; Instructional Evaluation.

TANNER, MARK, *Assistant Professor.* PhD, University of Pennsylvania, 1991. Language Acquisition; TESL.

The following are linguists in language departments who frequently teach linguistics courses in their own disciplines or in the Department of Linguistics and who also serve on graduate and other committees for the Linguistics Department:

BELNAP, R. KIRK—Asian Languages

BOURGERIE, DANA—Chinese

BUSH, CHARLES—Computer Applications

EGGINGTON, WILLIAM—English

FAILS, WILLIS C.—Spanish

HALLEN, CYNTHIA—English

HART, DAVID K.—Russian

JARVIS, DONALD—Russian

JONES, RANDALL L.—German

LARSON, JERRY—Spanish

LUND, RANDALL—German

MATHEWS, THOMAS J.—Spanish

MEREDITH, R. ALAN—Spanish

OAKS, DALLIN D.—English

PARKINSON, DILWORTH B.—Arabic

RUSSELL, ROBERT A.—Japanese and Arabic

SKOUSEN, ROYAL—English

SMITH, KIM—Computer Applications

TURLEY, JEFFREY S.—Spanish

WATABE, MASAKAZU—Japanese

MANAGEMENT COMMUNICATION

Chair: Paul R. Timm

590 TNRB
PO Box 23041
Provo, UT 84602-3041
(801) 378-5682

The Department of Management Communication does not offer a graduate degree. It offers the following graduate course plus other courses included in the Master of Business Administration, Accountancy and Information Systems, and Public Management sections of this catalog. For faculty listings, refer to the BYU Undergraduate Catalog.

COURSE DESCRIPTION

642. Communication for Professional Accounting. (1.5)

Prerequisite: MCom 320, 321.

Theory and application of written and oral communication for professional accounting.

MANAGERIAL ECONOMICS

Chair: Dwight M. Blood
Graduate Coordinator: B. Michael Pritchett

610 TNRB
 PO Box 23167
 Provo, UT 84602-3167
 (801) 378-2364

THE PROGRAM OF STUDIES

A graduate specialty in managerial economics has proven valuable to several types of students. Among these are (1) students seeking a distinct specialty as part of a professional degree, such as the MBA, MPA, or law degrees; (2) students seeking positions that require specific abilities to apply economic analysis; and (3) students wishing to strengthen their training before entering (or applying for) a PhD or other graduate program. Students should understand that, traditionally, the terminal degree for an economist has been the PhD. Therefore, students should seek to go directly into a PhD program at another university unless they have clearly defined reasons to pursue other graduate training here (such as those related to items 1–3 above).

Experience in placing graduates suggests that students are well served by having a specific emphasis and a strong quantitative foundation. This emphasis is often particularly valuable when developed with such areas as finance, marketing, management, operations, or public administration. Members of the faculty are available to consult with students concerning their degree alternatives, plans of study, and career development.

Of special interest to entering MBA students with an undergraduate degree in economics (or considerable undergraduate training in economics) is the concentration in managerial economics offered in the MBA Program. Interested students should see the department chair for further information.

One degree is offered through the Department of Managerial Economics: Managerial Economics—MS. Fewer than ten students are admitted to this program annually. Most qualified students are able to complete this degree within one calendar year.

Managerial Economics—MS

This degree emphasizes training in applied economic analysis and specialties. Typical students become especially knowledgeable in model formulation and estimation. They learn forecasting methods and other analytical techniques used in managerial decision making. Graduates are trained in empirical and analytical techniques related to firms, industries, and the national and international economic environment.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international); winter, September 15 (U.S. and international); spring, January 15 (U.S. and international); and summer, February 15 (U.S. and international).
- Entrance examinations: GMAT, GRE general test, or an equivalent. TOEFL or Michigan Test in English required of international students who do not speak English as their first language.
- Prerequisite: intermediate microeconomic and macroeconomic theory, principles of statistics (3 hours) and introductory calculus (3 hours).

Requirements for Degree.

- Credit hours:
Thesis Option (30): minimum 24 course work hours plus 6 thesis hours (ManEc 699R).
Project Option (33): minimum 33 course work hours plus major research project. (Consult department for full program description and additional course requirements.)
- Examination: oral defense of thesis or project.

FINANCIAL ASSISTANCE

The department allocates grants to only two or three students per year. In addition, a number of qualified students are hired as research and teaching assistants. Assistants are usually hired for ten hours per week at prevailing university wages. Students may apply for these positions by filing a completed application with the Managerial Economics Department. Selection of assistants is made according to the specific needs of the faculty and the talents and experience of the applicants.

RESOURCES AND OPPORTUNITIES

The N. Eldon Tanner Building, which houses the Department of Managerial Economics, is one of the finest facilities of its kind. Surrounding the dramatic eight-story atrium at its center are lecture and seminar rooms, study rooms, a computer laboratory, and a working library.

This graduate program allows maximum flexibility in creating plans of study appropriate to each student. The courses and academic resources of many of the programs and departments of the Marriott School of Management and Brigham Young University may be considered as a part of these plans with the agreement of the student's major professor.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

552. Urban Analysis. (3)

Prerequisite: ManEc 300, 301, or equivalent.

Applying economic theory to urban problems and policies.

576. Topics in Government and Business. (3)

Prerequisite: ManEc 300, 301, or instructor's consent.

Analyses of either antitrust or public regulation of business (varies with semester).

589R. Mathematical Theory of Managerial Economics. (3)

Prerequisite: ManEc 300, 301, 486, or instructor's consent.

Mathematics of optimization as applied to economic decisions.

594R. Seminars in Selected Managerial Economics Topics. (1-6)

Prerequisite: instructor's consent.

Seminars covering a variety of topics in economic policy and theory.

595R. Lectures in Managerial Economics. (1-3)

Prerequisite: instructor's consent.

596R. Readings in Managerial Economics. (1-3)

Prerequisite: instructor's consent.

597R. Research in Managerial Economics. (1-3)

Prerequisite: instructor's consent.

610. (ManEc-MBA) Consulting Applications of Economic Analysis. (3)

Applying economics, including dynamic modeling, to problems of managing business transactions.

611. (ManEc-MBA) National and International Business Environment. (3)

Macroeconomy presented at an intermediate level with special attention to government and international trade sectors.

613. (ManEc-MBA) Business and Economic Forecasting. (3)

Application of forecasting methodologies, with an emphasis on time series analysis.

614. (ManEc-MBA) Market Analysis and Decision Making. (3)

Use of marketing research, economic theory, and statistics in managerial decision making. Understanding manager's role in working with technical specialists to improve business planning.

615R. (ManEc-MBA) Seminar in Managerial Economics. (3)

Preparing and presenting economic analysis to line managers.

688. (ManEc-MBA) Applied Econometrics. (3)

Prerequisite: ManEc 300, 301, calculus or equivalent, and a first course in econometrics.

Econometric techniques and applications.

689. Advanced Econometric Techniques. (3)

Prerequisite: ManEc 688 or Econ 388.

Econometric techniques such as time series analysis, nonlinear estimation techniques, and simultaneous equation models.

699R. Master's Thesis. (3-6)

FACULTY

BARNES, HOWARD W., Professor. Dr. rer. pol., Technical University of Brunswick, Federal Republic of Germany, 1968. Marketing; International Business.

BLOOD, DWIGHT M., Professor. PhD, University of Michigan, 1963. Micro and Macro Theory; Macro Policy.

BRYSON, PHILLIP J., Professor. PhD, Ohio State University, 1967. Comparative Economic Systems; Microeconomics.

CLARKE, DARRAL G., Professor. PhD, Purdue University, 1972. Quantitative Methods; Economic Marketing Analysis; Strategic Planning.

CRAWFORD, ROBERT G., Associate Professor. PhD, Carnegie-Mellon University, 1975. Business Economics.

KOLLER, ROLAND H., II, Associate Professor. PhD, University of Wisconsin, Madison, 1969. Economics; Industrial Organization.

MCDONALD, JAMES B., Professor. PhD, Purdue University, 1970. Quantitative Methods; Econometrics.

NELSON, RAY D., Associate Professor. PhD, University of California, Berkeley, 1981. Speculative Markets; Applied Statistical Modeling; Decision Making Under Uncertainty.

PRITCHETT, B. MICHAEL, Professor. PhD, Purdue University, 1970. Quantitative Methods; Econometrics; Public Finance.

MANUFACTURING ENGINEERING AND ENGINEERING TECHNOLOGY

Chair: A. Brent Strong

Graduate Coordinator: W. Edward Red

435-R CTB

PO Box 24211

Provo, UT 84602-4211

(801) 378-5539

THE PROGRAM OF STUDIES

The disciplines of manufacturing engineering, manufacturing engineering technology, and electrical engineering technology apply engineering methods to the manufacture of products and the control of manufacturing processes. It has been shown that over 50 percent of all engineering graduates eventually integrate into the manufacturing mainstream, regardless of engineering discipline. Indeed, the health of modern societies is directly measured by the health of their manufacturing industries.

Increased international focus on manufacturing productivity has thrust the most advanced technologies directly into the manufacturing arena. Long considered one of the premiere international manufacturing programs, the program at Brigham Young University is supplemented by modern topics and laboratories in areas like robotics, advanced manufacturing simulation, computer-integrated manufacturing (CIM), advanced material processing techniques, and the newest industrial automation technologies. Laboratories and equipment offer dynamic and state-of-the-art experiences in applied engineering.

Four degrees are offered through the Department of Manufacturing Engineering and Engineering Technology: Computer-Integrated Manufacturing—MS; Manufacturing Engineering—MS; Engineering Management—

MEM; and Technology Management—MTM. An accelerated, industry-sponsored degree, Computer-Integrated Manufacturing—MS, is also available for certain candidates.

In cooperation with the Mechanical Engineering Department, a PhD in mechanical engineering with a manufacturing engineering emphasis is also offered. Refer to the Mechanical Engineering section on p. 176 for PhD admission and degree information.

Twenty faculty professionals having diverse educational and experiential backgrounds provide strong research and student mentoring leadership in a variety of manufacturing areas such as robotics, simulation, materials, integrated circuits, new product realization, and automation. The faculty is well published, involved in community and professional affairs, and indirectly involved in the development and commercialization of recognized software and hardware products used throughout the world.

From approximately twenty to twenty-five students are admitted to the graduate programs annually, having a broad variety of undergraduate degrees, but distinguished by their manufacturing interests. The enormity of the manufacturing enterprise means that graduating students can find positions in almost any manufacturing-related industry and are rarely constrained by region.

Computer-Integrated Manufacturing (CIM)—MS

Computer-integrated manufacturing (CIM) is the integration of manufacturing processes and the information that surrounds these processes. CIM is concerned with the flow of information as well as with the flow of materials. Although concerned with the computerization of production processes, CIM also encompasses the information flow involved in production control, material handling, inventory control, quality assurance, and maintenance.

This program is available to graduates from engineering, technology, math, or science programs who are interested in the integration of manufacturing processes. Graduates from other programs may be considered.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and May 15 (U.S.); winter, June 30 (international) and September 15 (U.S.); spring, October 31 (international) and February 15 (U.S.); summer, December 31 (international) and March 15 (U.S.).
- Application requirements: 3.0 or higher GPA. Consult graduate coordinator for additional information.
- Entrance examinations: GRE general test. For all international applicants whose native language is not English, a TOEFL score of 570 is also required.
- Prerequisite: baccalaureate degree in engineering, engineering technology, or a related field with departmental approval; basic sciences background, along with engineering, mathematics, and modern manufacturing methods. All prerequisites must be completed before entrance into the program. Students must make up any deficiencies after consultation with a graduate faculty member and approval from the department.

Requirements for Degree.

- Credit hours (34): minimum 25 course work hours plus 9 thesis hours (MFET 699R).
- Required courses: core classes—MFET 529, 533, 534; 591R (1 hour).
- Electives: minimum 15 hours from approved courses. The electives must include one mathematics course above integral calculus or one approved statistics course (unless satisfied before entering program). A study list of proposed courses is required.
- Thesis: minimum 9 thesis hours; prospectus.
- Examination: oral defense of thesis.

Manufacturing Engineering—MS

The MS degree is awarded to students who have mastered professional education in selected areas of manufacturing engineering. Such education is gained through graduate course work that, unlike bachelor's course work, consists largely of elective courses. Students gain the added experience of participation in research work at the cutting edge of the profession. This research work culminates in a high-quality presentation (the thesis). The MS degree normally requires a minimum one year beyond the bachelor's degree.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and May 15 (U.S.); winter, June 30 (international) and September 15 (U.S.); spring, October 31 (international) and February 20 (U.S.); summer, December 31 (international) and April 15 (U.S.).
- Application requirements: 3.0 or higher GPA; baccalaureate degree (or equivalent) in manufacturing engineering from a school accredited by the ABET; applicants with BS degrees in other engineering fields, engineering technology, chemistry, physics, material science, or metallurgy can only be admitted provisionally.
- Entrance examinations: passing grade in the Fundamentals of Engineering (FE, formerly EIT) examination is required. (The exam is offered by the state of Utah in April and October.) Alternately, a student may take the engineering subject test in the GRE examination. A minimum TOEFL score of 570 is required for all international applicants whose native language is not English.
- Prerequisites: determined in consultation with a graduate faculty member and approval from the department; may be completed on a provisional entrance into the program. (This should be done before registering for any courses in the program.)

Requirements for Degree.

- Credit hours (34): minimum 25 course work hours including 1 hour of MFET 591R plus 9 thesis hours (MFET 699R).
- Study list: students must submit to their advisors a proposed study list and a written justification for the courses to be studied, which must then be approved by the graduate coordinator.
- Prospectus: students must submit to their advisors a written prospectus on a proposed thesis topic, which must then be approved by the graduate coordinator.
- Thesis: 9 credit hours. An article suitable for publication should result from the thesis.
- Oral defense of thesis.

Manufacturing Engineering (Industrial)—MS

An accelerated MS program is available to certain industrial employees who are graduates in engineering, engineering technology, or related fields. The program allows candidates to earn a master's degree in five spring terms of five weeks each and requires a thesis (MFET 698R, 3 credits):

- Credit hours (34): minimum 25 course work hours.
- Thesis hours (9)

Consult the graduate coordinator for more information.

Engineering Management—MEM, Technology Management—MTM

The MEM and MTM are jointly sponsored by the Marriott School of Management and the College of Engineering and Technology. As such, the program incorporates increased technical learning in engineering management and engineering technology with those skills needed to become an efficient and effective manager. With this focus, the type of career preparation gained will allow the student to remain in professional engineering activities and yet be capable of working with managers or becoming a manager of technical activities.

The majority of MEM/MTM graduates enter industry in positions determined by their technical background, but the program more fully prepares them to move into management positions. Students graduate with an increased awareness of the interrelationship of engineering, marketing, production, finance, operations management, accounting, and other essential managerial skills.

Minimum requirements include a BS degree in engineering or technology or enrollment in an integrated master's program (with the expectation of completing a BS degree by December of the year of entry and the ability to include required management courses taught during the term or semester of entry).

Qualified engineering graduates are admitted to the MEM program. Qualified technology graduates are admitted to the MTM program.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 1 (U.S. and international). Fall semester entrance is strongly recommended. Entry spring and summer terms is available but will extend the length of the program.
- Application requirements: the entrance examination is the GRE general test for applicants from non-ABET (Accreditation Board for Engineering and Technology, Inc.) accredited institutions. Indicate in writing a desire to be considered for the program. Submit application to Graduate Admissions, B-356 ASB, PO Box 21341, Provo, UT 84602-1341.
- Prerequisite: baccalaureate degree in engineering.

Requirements for Degree.

- Credit hours (40): minimum 40 course work credit hours.
- Basic curriculum requirements: *fall semester*—Mgt 501 (3), 561 (3), EngT 500 (1), technical electives (6); *winter semester*—Mgt 511 (3), 541 (3), 562 (3), EngT 501 (1), technical elective (3); *spring term*—Mgt 551 (3),

technical elective (3); *summer term*—Mgt 580 (3), 565 (2), technical elective (3). See p. 116 for course descriptions.

FINANCIAL ASSISTANCE

All graduate students with regular degree-seeking status are eligible for various departmental financial aid, available in the following forms:

Graders or Teaching Assistants.

Graduate students may be hired up to 30 hours per week (20 hours for international students) to grade papers or to serve as teaching assistants for classes in their technical field.

BYU Supplementary Awards. A limited number of tuition scholarships are available. These are normally awarded by committee to those who make application.

Research Assistants. All students, regardless of status, are also eligible for research assistantships from funded projects. However, funding is solely dependent on availability of research funds through the student's research advisor.

Interested students should contact the graduate coordinator for applications and for further rules on employment.

RESOURCES AND OPPORTUNITIES

The College of Engineering and Technology, of which the Department of Manufacturing Engineering and Engineering Technology is a part, has experienced rapid growth in funded research during the past decade. In recent years the college research budget has continued to grow steadily, with the budget for the 1994–95 fiscal year exceeding \$9 million. A national leader in several areas, college research organizations now have several centers: the Advanced Combustion Engineering Research Center (ACERC), the Advanced Composites Manufacturing and Engineering Center (ACME), and the Rapid Product Realization (RPR) Center.

This includes one of the prestigious National Science Foundation engineering research centers, four research laboratories, and three state-funded Centers of Excellence. More than half the faculty participate in research endeavors, and a number have gained international recognition for their work.

Both the ACME and RPR centers are operated by the Manufacturing Engineering and Engineering Technology Department. Short descriptions follow.

Center for Advanced Composites Manufacturing and Engineering (ACME). The three-fold mission is to:

- Provide extension services designed to assist Utah companies in areas such as development of product prototypes, testing of new innovations, and improving manufacturing methods.
- Provide industrial education and training.
- Develop innovative new technologies resulting in new companies, patents, and licences.

The center has helped create \$37.2 million in actual business through extension services and other related activities and has indirectly provided 437 new jobs in spin-off companies. Although a recent center, 102 companies have been assisted. Many new companies have been launched that use the center's resources, and an extensive set of test analysis and manufacturing equipment has been acquired. Several patents have already been processed and several conferences sponsored.

Rapid Product Realization (RPR)

Center. Established in 1994, this new center is organized to take a product from its initial concept through design prototype—and even through marketing—using the department's extensive resources, including a computer-assisted design lab, robots, foundry, industrial laminators, high-pressure water jet, mechanical presses, lathes, electronics lab, and many other design and manufacturing systems.

The center will annually identify about ten new Utah-based products to assist in product maturing, with particular focus on products with ten or fewer parts that would sell for less than \$200.

Both applied and basic research is conducted over a variety of manufacturing areas, such as open architecture simulation and control of manufacturing cells, study of material microstructure, rapid product realization, factory floor simulation, and composites and plastics processing.

A recent large award by NASA to the department will focus on multidisciplinary product development, incorporating graduate students and faculty from the Manufacturing Engineering and Engineering Technology Department, Mechanical Engineering Department, Visual Arts Department, and Marriott School of Management. A unique phased approach toward new product development will involve multidisciplinary teams of graduate students and new design and integration methods.

Please review the faculty section that follows for more specific research areas.

COURSE DESCRIPTIONS

Note: Most graduate-level courses in this department are offered only once per year.

501. Fundamentals of Manufacturing Processes, Design, Materials, and Information Transfer. (3)

Overview of how things are made, with focus on the interrelation of manufacturing processes, design, materials, and information transfer. Importance of manufacturing in society.

528. Electronic Fabrication and Assembly. (3)

Prerequisite: EET 314 or equivalent and instructor's consent.

Theory and application of manufacturing processes required to produce electronic equipment.

529. Manufacturing Information Processing and Networks. (3)

Prerequisite: Phscs 221, EET 443, or instructor's consent.

Function and system analysis and application for sensing, sending, and processing manufacturing information; metallic and lightwave technology networking; data, media, standards, topologies, protocols, instrumentation, and integration.

531. Advanced Computer Numerical Control Programming. (3)

Prerequisite: MET 230, CS 142, or instructor's consent.

Programming techniques and requirements for manufacturing components on computer numerical control machining centers, emphasizing programming, applications, and software development.

532. Group Technology. (3)

Prerequisite: MET 332 or instructor's consent.

Classification theory and practice applied to workpiece classification and coding, statistics, cellular production, design retrieval, and implementation strategies, emphasizing computer application.

533. Computer-Integrated Manufacturing. (3)

Prerequisite: MFE 362, 480, or instructor's consent.

Basic activities, elements, and principles of computer-aided manufacturing, including terminology, systems integration, architecture, database development, interfaces, and computer hardware and software requirements, with justification and implementation plans.

534. Automation. (3)

Determining appropriate levels of manufacturing automation based on economics and productivity. Elements of automation, including sensors, robots, conveyors, and part feeders.

536R. Advanced Process Mechanics. (3)

Prerequisite: MFE 432.

Analysis and experimental validation of selected manufacturing processes.

537. Advanced Mechanisms. (3)

Prerequisite: MeEn 337.

Kinematics and dynamics of advanced mechanisms, such as robots, with computer simulation of their motion. Task planning and simulation of mechanism activities in manufacturing work cells.

538. Technical Management. (3)

Techniques and tools for effective technical management. Management, analysis, cost justification, and communication skills within manufacturing or engineering environments.

540. Computer-Aided Testing. (3)

Prerequisite: instructor's consent.

Introduction to computer-aided testing for product quality assurance using microcomputers, IEEE bus instrumentation, and host minicomputer systems.

541. Advanced Materials Science. (3)

Prerequisite: MET 335 or MFE 250; CEEn 203.

Builds on student's manufacturing and materials background to investigate interrelationship of material and process.

547. Information Transmission. (3)

Prerequisite: Phscs 221, EET 443, or instructor's consent.

Function and system analysis and applications for sensing, sending, and processing information.

553. (MFET-MeEn) Mechanical Behavior of Polymers. (3)

Prerequisite: CEEn 203, MFE 355, or instructor's consent.

Generalized elasticity relationships, viscoelasticity, yielding and fracture, crazing, rubber elasticity, anisotropic behavior, processing effects on properties, optical and other properties.

555. Introduction to Composites. (3)

Prerequisite: instructor's consent.

Structure, processing, properties, and uses of composite materials, including various manufacturing methods and the relationship between properties and fabrication.

572. Design for Manufacturing. (3)

Prerequisite: senior standing.

Introduction to design evaluation tools for use by product teams, including quality function development, early cost estimating, and design for assembly.

574. Tool Engineering. (3)

Prerequisite: MFE 434 and senior standing.

Design of production machines and tools with functionality, producibility, maintainability, and cost considerations utilizing concurrent product and process design approach.

580. Manufacturing Simulation. (3)

Prerequisite: MFE 362 and instructor's consent.

Design and optimization of manufacturing systems using simulation. Simulation languages and modeling methodology.

591R. Graduate Seminar. (0.5)

Prerequisite: graduate standing.

Topics in research and thesis writing. Graduate students will present thesis and dissertation subject.

592R. Materials Seminar. (0.5)

Advanced topics in materials science and engineering.

595R. Special Topics. (Arr.)

Prerequisite: instructor's and departmental consent.

655. Polymer Processing. (3)

Prerequisite: MeEn 312, MFE 355, or instructor's consent.

Rheology and transport phenomena involving polymeric fluids, including an analysis of extrusion, calendering, die forming, mixing, compression and injection molding, molding of reacting polymers, filament winding, and pultrusion.

656. Microstructure and Properties of Metal Alloys. (3)

Treatment of models relating representations of microstructure to mechanical and physical properties of polycrystalline materials. Special emphasis on applications to optimal processing.

698R. Master's Project in Computer-Integrated Manufacturing. (1-3)

Prerequisite: departmental consent.

699R. Master's Thesis. (1-9)

Prerequisite: departmental consent.

FACULTY

CARTER, PERRY W., II, *Assistant Professor*. MS, Brigham Young University, 1974. Automatic Assembly.

HARRELL, CHARLES R., *Associate Professor*. PhD, University of Denmark, 1988. Simulation.

HAWKS, VAL D., *Associate Professor*. MIE, Lehigh University, 1986. CIM Database Management Systems.

HELPS, C. RICHARD G., *Assistant Professor*. MSEE, Witwatersrand University, Johannesburg, South Africa, 1986. Real-Time; Process Control; Automation Systems.

JOHNSON, A. KENT, *Associate Professor*. PhD, Stevens Institute of Technology, 1965. Electronic Filters.

KOHKONEN, KENT E., *Assistant Professor*. MS, Brigham Young University, 1976. CNC Software Development; Processing Languages; Parametric Programming.

KUNZLER, JOHN J., JR., *Associate Professor*. MS, Brigham Young University, 1980. Computer-Integrated Manufacturing; Manufacturing Systems.

OWEN, EARL F., *Assistant Professor*. MS, University of Utah, 1972. RF Microwave Circuits.

RED, W. EDWARD, *Professor*. PhD, Arizona State University, 1972. Robotics; Automation; Applied Mechanics.

ROTZ, CHRISTOPHER A., *Associate Professor*. PhD, Massachusetts Institute of Technology, 1978. Polymer Properties; Processing Composites.

SMART, MERRILL J., *Associate Professor*. MS, University of Utah, 1962. Real-Time Computer Systems.

SORENSEN, CARL D., *Associate Professor*. PhD, Massachusetts Institute of Technology, 1985. Design for Manufacture; Manufacturing Processes.

STRONG, A. BRENT, *Professor*. PhD, University of Utah, 1971. Composites; Plasma Surface Treatments; Plastics.

TODD, ROBERT H., *Professor*. PhD, Stanford University, 1971. Manufacturing Processes; Process Machine Development; Manufacturing Systems; Engineering Design.

MARRIOTT SCHOOL OF MANAGEMENT

Dean: K. Fred Skousen

Associate Dean: Kim S. Cameron

Associate Dean: Gary C. Cornia

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In the nineties the challenges and opportunities surrounding management education are many. The faculty and administrators of the J. Willard and Alice S. Marriott School of Management (MSM) recognize this and have established centers of excellence within its graduate programs to respond to the management needs of both the nineties and the twenty-first century. These centers can be defined as a group of people—faculty, students, and external supporters—who work together on a focused area of interest, e.g., international business, entrepreneurship, ethics, or general management. The centers benefit the teaching, learning, and research functions within the Marriott School and they foster a philosophy of reciprocity among groups that affiliate with it.

FACULTY

The MSM graduate programs have excellent, well-prepared faculty members who are productive scholars with a commitment to students and to teaching. MSM faculty are willing and able to teach, direct, and inspire students as well as colleagues. The MSM's goal is to have faculty who are committed to excellence in all their activities, including teaching, research and writing, professional development, and academic service. In this role, they become mentors as well as teachers. MSM faculty strive to prepare graduates who can (1) approach business and management with an ethical foundation that does not sacrifice societal and ethical values for personal gain, (2) take a global

perspective of management and of mankind, and (3) function comfortably with modern information technology, adapting to the latest technology in traditional, as well as creative, ways that will enable them to bring a competitive edge to everything they do.

STUDENTS

Students who are enrolled in the MSM professional programs develop both intellectually and spiritually. They require a broader education, one that prepares them to be adaptable and to exercise good people skills as they work with a diverse workforce that includes more women, minorities, and internationals. This contemporary workplace creates a demand for wisdom and good judgment in all management positions. When MSM students graduate, they need to be prepared to serve productively and positively in a dynamic world. MSM professional programs are designed to meet these challenges.

MISSION STATEMENT

The mission of the Marriott School of Management is to educate students with the ethical values, management skills, and leadership abilities needed in organizations worldwide; to conduct and publish research on management topics that are useful in academic and management environments; and to foster an attitude of responsibility and service toward society. To accomplish this, the MSM will attract and develop an outstanding faculty; will educate students who are dedicated to personal integrity and a strong work ethic; will build effective partnerships with students, faculty, external support groups, and the general management community; and will strive for excellence in whatever is done within the MSM.

FACILITIES

The MSM is housed in the N. Eldon Tanner Building. It provides outstanding facilities for both students and fac-

ulty. Graduate students have access to computers and software that will help to prepare them for today's and future management challenges. Student interaction areas, small-group study rooms, and case-study classrooms provide settings for stimulating exchanges. The Tanner Building sets a tone conducive to study, learning, and research.

FINANCIAL AID

The Marriott School of Management provides financial aid for qualified students through the following:

- MSM Scholarship Fund
- Private scholarship donations
- Assistantship awards
- Loan assistance

Assistantships. Assistantships, requiring modest amounts of work, are available within the MSM to qualified students. Research and teaching assistantships are considered a valuable part of the educational experience and are encouraged.

MARRIOTT SCHOOL OF MANAGEMENT LOANS

BYU Marriott School of Management loans are available to full-time day students who need assistance in addition to their personal savings, work, and other family resources. These loans may be made each year up to \$6,000. Cumulative loan amounts should not exceed \$12,000 for the two years of Marriott School of Management work. Repayment of the loan will start six months from the time of discontinuance of full-time student status.

BYU SHORT-TERM LOANS

BYU short-term loans are available to part-time day students, full-time day students, and full-time evening students admitted to day school. These loans may be made up to the costs of tuition only.

GUARANTEED STUDENT LOANS

Guaranteed loan programs enable qualified students in good standing, who have been admitted to day school classes, to borrow directly from banks, credit unions, savings and loan associations, or other participating lenders who agree to make educational loans. These loans are not available to international students. Details are available in A-51 of the Abraham Smoot Building.

THE PROGRAM OF STUDIES

Four degrees are offered through the Marriott School of Management: Master of Business Administration—MBA, Master of Accountancy—MAcc, Master of Public Administration—MPA, and Master of Organizational Behavior—MOB.

The professional programs in the Marriott School of Management are designed to prepare qualified students for rewarding and responsible careers in management and administration. The MSM approach to management education can be viewed as general management education, complemented by specialization in underlying disciplines.

Graduates of these programs are expected to possess those professional attributes that will enable them to achieve positions of leadership in the private and public sectors. These attributes include technical proficiency in a broad range of sophisticated management tools and concepts and the ability to apply these tools and concepts in solving vital problems. Other attributes of equal importance expected of graduates are (1) a commitment to maintain high standards of personal integrity, (2) expertise in dealing with organizational and human issues, (3) strong interpersonal, communication, and leadership skills, and (4) an appreciation of social, political, and economic environments in which public and private organizations operate.

The dual emphasis in the Marriott School of Management on technical proficiency and personal integrity constitutes an approach to education in management leadership that permeates the four allied professional programs. Students will be encouraged to strive for excellence in all of their educational activities.

Master of Business Administration

Graduates of the MBA Program are prepared through two challenging years of rigorous study and experience to hold responsible, interesting positions in large and small corporations.

Besides providing innovative education in business subjects like marketing, operations, organizational behavior, and finance, the program stresses subjects that emphasize integration, globalization, technology, and entrepreneurship. Such emphases prepare students for the complexities within which business operates today. Leadership opportunities and group study further prepare students for management in tomorrow's workplace.

Students participate in a common core that includes written and oral communication the first year and that follows "tracks" toward the general management degree the second year.

The program also offers the Executive MBA Option, as well as joint degree programs with the J. Reuben Clark Law School and the David M. Kennedy Center for International Studies. See *Business Administration*, p. 63.

Master of Accountancy.

The master of accountancy degree is awarded on completion of a three-year professional program. The objective of the program, administered through the School of Accountancy and Information Systems (SOAIS), is to develop graduates who exhibit professionalism and are qualified with

specialized knowledge in one or more accounting areas.

The Master of Accountancy Program prepares students for careers as auditors in taxation, as controllers and financial officers, or as consultants in corporations, not-for-profit organizations, and public accounting. To prepare for these careers, students have the opportunity to select one of the following three specialized programs: professional accountancy, tax, or accounting information systems. See *Accounting and Information Systems*, p. 45.

Master of Public Administration

The master of public administration (MPA) degree is offered through the Institute of Public Management, which is nationally recognized for its outstanding curriculum and faculty. Like all MSM programs, the two-year MPA Program has the objective of preparing men and women for professional careers. The MPA Program has a specific mission and focus: to educate its students to be leaders in public and not-for-profit organizations.

The MPA Program offers its students areas of emphasis or concentration within the broad field of public administration: personnel management, city management, finance administration, and management and policy analysis. Alternatively, students may choose to pursue a general management concentration by combining two or more of the above concentrations.

With the expansion of government and nonprofit services in recent years, the need for professionally educated managers has grown accordingly. Unique and challenging opportunities await the MPA graduate. See *Public Management*, p. 214.

Master of Organizational Behavior

The Master of Organizational Behavior Program is a small, highly selective program designed to meet the needs of individuals in two categories:

(1) those who plan to pursue a doctoral degree in organizational behavior to prepare for university teaching, consulting, or equivalent positions or (2) those who wish to take positions in industry upon completion of their studies. Graduates of the program are most likely to be involved as specialists in human resource planning and development, labor relations, or organizational development. Ideally, each individual's program will be tailored to his or her needs. Each person admitted will spend some time working closely with faculty members doing organizational field research and teaching. Joint MOB/MA degrees with the David M. Kennedy Center are available. See *Organizational Behavior*, p. 195.

Accreditation

The Master of Business Administration and the Master of Accountancy Programs are accredited by the American Assembly of Collegiate Schools of Business. The School of Accountancy and Information Systems is also a member of the Federation of Schools of Accountancy. The MPA Program is accredited by the National Association of Schools of Public Affairs and Administration.

MATHEMATICS

Chair: Gerald M. Armstrong

Associate Chair: Jacqueline

Taylor-Ortega

Graduate Coordinator: David G. Wright

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Provo, UT 84602-6542
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THE PROGRAM OF STUDIES

The Department of Mathematics has approximately forty graduate students, most of whom are supported by teaching assistantships for which they receive tuition support as well as a stipend for providing teaching support in college algebra and calculus.

Four degrees are offered through the Department of Mathematics: Mathematics—MS, Mathematics—MA, Mathematics—PhD, and Mathematics Education—MA.

MS and MA students study mathematics courses in preparation for careers in business, industry, government, or education. Other students use a master's degree in mathematics in preparation for a doctoral degree in mathematics or a closely related discipline or a discipline where technical competence is appreciated. Master's students graduate in an average of two years.

The department supports from ten to twelve PhD students. Designed for gifted and dedicated students, the program requires about four years past a master's degree. The department has special strength in the areas of applied mathematics, algebraic geometry, analytic number theory, geometric topology and group theory, and linear analysis.

Mathematics—MS

The master of science is designed to prepare students for positions in business and industry. It also provides

preparation for further graduate study leading to a doctoral degree.

Information for Degree—Thesis and Nonthesis Programs. Graduate mathematics courses: approved graduate mathematics courses include all classes numbered 500 and above with the exceptions of 501, 502, 529R, and 629. Faculty sponsor: the graduate coordinator will assign each student a faculty sponsor on admission to the graduate program. Students should communicate with the sponsor as soon as they arrive on campus.

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, spring, summer, March 1 (U.S. and international).
- Entrance examinations: GRE general test and subject test in mathematics. Every international applicant whose native language is not English is required to submit Test of English as a Foreign Language (TOEFL) scores.
- Prerequisite: credit at least equivalent to BYU requirements for a baccalaureate degree in mathematics; a year's sequence in abstract algebra; and a year's sequence in advanced calculus.

Requirements for Degree—Thesis Program.

- Credit hours (30): minimum 24 course work hours in approved graduate mathematics, including 12 hours in courses numbered 600 or above and 6 thesis hours (Math 699R).
- Thesis.
- Oral defense of thesis.

Requirements for Degree—Nonthesis Program.

- Credit hours:
Traditional Mathematics Option: minimum 30 course work hours in approved graduate mathematics, including 18 hours in courses numbered 600 or above.

Minor Option (33): minimum 24 course work hours in approved graduate mathematics, including 6 hours in courses numbered 600 or above and 9 hours in an approved minor.

Applied Option (36): minimum 24 course work hours in approved graduate mathematics, including 6 hours in courses numbered 600 or above and 12 hours in areas related to applications of mathematics. The 12 hours of application must be approved by the graduate coordinator.

- Paper and presentation: write a paper on an area of advanced mathematics and give a 45-minute presentation based on the paper.
- Examination: pass a written master's examination. Normally the examination must be taken no later than the end of the first year of graduate work. This requirement may also be filled by a sufficiently high score on the PhD written examination.

Mathematics—MA

The MA curriculum is designed to prepare students for teaching mathematics in a junior college or secondary school.

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, spring, summer, March 1 (U.S. and international).
- Entrance examination: GRE test is recommended (required for international applicants).
- Prerequisite: credit at least equivalent to current BYU requirements for a BA degree in education with a teaching major in mathematics or a BA degree in mathematics.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Math 699R).
- State teacher certification (required certification courses may not be part of the graduate program).
- Required courses: Math 315, 541, 629; any two-semester 600 sequence or Math 551, 552.

- Minor (optional): any approved minor.
- Thesis.
- Examination: oral defense of thesis.

Mathematics Education—MA

The master of arts in mathematics education caters to secondary teachers of mathematics who do not have an undergraduate major in mathematics. It gives them an opportunity to put their teaching on firm mathematical ground.

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, spring, summer, March 1 (U. S. and international).
- Entrance examination: GRE recommended (required for international applicants).
- Prerequisite: in-service status as a secondary teacher of mathematics.

Requirements for Degree.

- Credit hours: minimum 36 course work hours (at least 24 hours in mathematics, up to 12 hours in education). At least 20 hours must be in the 500 series or above.
- Required courses: Math 629.
- No thesis required.

Mathematics—PhD

The doctoral program prepares students for a career in research and teaching at the university level or in basic research in a nonacademic setting.

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, spring, summer, March 1 (U.S. and international).
- Entrance examinations: GRE general test and GRE subject test in mathematics. Every international applicant whose native language is not English is required to take the Test of English as a Foreign Language (TOEFL).
- Prerequisite: undergraduate degree in mathematics or its equivalent; one year of mathematical analysis (or advanced calculus); one year of

abstract algebra, including linear algebra.

Requirements for Degree.

- Credit hours (54): minimum 36 course work hours in mathematics courses numbered 600 or above with a grade of B or better in each, plus 18 dissertation hours (Math 799R).
- Required courses: complete at least 3 hours each in algebra, analysis, applied mathematics, and geometry/topology.
- Examinations:

Written Examinations: at the beginning of the second year, pass examinations in three of the four areas of algebra, analysis, applied mathematics, and geometry/topology. Four hours are allotted to each examination. A failed examination may be repeated once at the beginning of the winter semester of the student's second year, after which permission must be obtained from the department graduate committee to retake the examination. Passed examinations need not be repeated. Syllabi are available for each examination.

Oral Examination: pass an oral qualifying examination covering the background necessary for research in a specific area. The student, having chosen a research area and having a dissertation advisor approved, will, with the advisor, outline suitable examination topics. These topics must be approved by an examination committee of three (including advisor) appointed by the department graduate committee, which conducts the examination.

Defense of Dissertation: a final oral defense of the dissertation is conducted by a faculty committee consisting of the student's research advisor, two other readers of the dissertation (one of whom may be an outside examiner) and two other members of the faculty.

- Language requirement: demonstrate proficiency in two approved foreign languages that are currently in major use in the mathematical literature. At present the approved languages are French, German, Russian, and Italian. Another language

in certain cases may be substituted for one of these if the department graduate committee approves. The committee will consider the current usage of the language in the student's specialty area. The examinations are offered by the Mathematics Department twice a year. They are designed to test a student's ability to translate, with the aid of a dictionary, mathematical literature into scientifically correct English.

- Dissertation.

FINANCIAL ASSISTANCE

Most of the graduate students in mathematics are supported by teaching assistantships. The usual load for a TA is two 3-hour sections (6 hours) both fall and winter semesters. The usual load for a PhD candidate acting as a TA is two 3-hour sections for one semester and one 3-hour section the second semester (if the student is making adequate progress on the qualifying exams. Current TAs receive from \$9,000 to \$11,000 per academic year as well as tuition support.

RESOURCES AND OPPORTUNITIES

Faculty research interests currently include: algebraic geometry; combinatorial group theory; geometric group theory; geometric topology; linear algebra; matrix analysis; number theory; and partial differential equations.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

501. Real Numbers. (3)

Prerequisite: Math 371.

Extensive examination of various axiomatic descriptions of the real numbers and interrelationships among these descriptions.

502. Set Theory. (3)

Prerequisite: Math 371.

Zermelo-Fraenkel axioms for set theory, the axiom of choice, ordinal and cardinal numbers, and algebra of sets.

511. Numerical Methods for Partial Differential Equations. (3)

Prerequisite: Math 311, 343; 313 or 434.
Recommended: Math 323.

Methods of characteristics, classification of equations, finite difference methods for partial differential equations.

512. Numerical Analysis. (3)

Prerequisite: Math 411.

Theory of constructive methods in mathematical analysis.

513R. Advanced Topics in Applied Mathematics. (3)

Prerequisite: instructor's consent.

521, 522. Methods of Applied Mathematics. (3 ea.)

Prerequisite: Math 343, 434.

Survey of current methods, continuous and discrete, including linear algebra, estimation, differential equations of equilibrium, eigenvalue and initial value problems; finite element, spectral, transform and difference methods; Fourier series, the Fourier matrix, fast Fourier transform; convolution.

529R. Topics in Mathematics Education. (3)

Prerequisite: instructor's consent.

Current research and curriculum in mathematics education nationally and internationally; research techniques and interpretation.

530. Calculus of Variations. (3)

Prerequisite: Math 343, 434. Recommended: Math 323, 541.

Euler-Lagrange equation, sufficient conditions, Hamilton's principle of least action, Dirichlet's principle; applications to mechanics, geometry, economics, eigenvalue problems, direct methods.

532. Complex Analysis. (3)

Prerequisite: Math 332 or instructor's consent.

Theory of complex analysis at the beginning graduate level. Topics: Cauchy integral equations, Riemann surfaces, Picard's theorem, etc.

541, 542. Real Analysis. (3 ea.)

Prerequisite: Math 315, 343, 344 for 541; Math 541 for 542.

Rigorous treatment of differentiation and integration theory, Lebesgue measure, Banach spaces.

543. Advanced Probability. (3)

Prerequisite: multivariable calculus.
Recommended: Stat 341 or 520.

Combinatorial methods, random walk, Markov chains, stochastic processes.

547. Partial Differential Equations. (3)

Prerequisite: Math 344, 434.

Topics from elliptic equations, heat equations; wave equations, stability, Fourier methods, energy methods, existence of solutions, etc.

551, 552. Introduction to Topology. (3 ea.)

Prerequisite: Math 315 for 551; Math 551 for 552.

Axiomatic treatment of linearly ordered spaces, metric spaces, arcs, and Jordan curves; types of connectedness.

585. Matrix Analysis. (3)

Prerequisite: Math 343.

Special classes of matrices, canonical forms, matrix and vector norms, localization of eigenvalues, matrix functions, applications.

595. Field Project in Mathematics Education. (4)

Prerequisite: instructor's consent.

Supervised project in mathematics classroom. Includes applying, testing, measuring, and reporting effectiveness of projects related to mathematics teaching methods or content.

621, 622. Matrix Theory. (3 ea.)

Prerequisite: Math 585

Zero-one matrices, spectra of graphs, Laplacian matrix, irreducible and primitive matrices, cycle expansion of the determinant, matrix completion problems, permanents, generalized matrix functions.

629. Teaching Mathematics in Secondary Schools. (3)

631, 632. Complex Analysis. (3 ea.)

Prerequisite: Math 332, 542 for 631; Math 631 for 632.

634, 635. Theory of Ordinary Differential Equations. (3 ea.)

Prerequisite: Math 434.

641, 642. Functions of Real and Complex Variables. (3 ea.)

Prerequisite: Math 542 or instructor's consent for 641; Math 641 for 642.

643R. Special Topics in Analysis. (3)

Prerequisite: Math 642.

Continued fractions, stochastic processes, generalized functions, etc.

644. Harmonic Analysis. (3)

Prerequisite: Math 532, 542.

Harmonic analysis on the torus and in Euclidean space; pointwise and norm convergence of Fourier series and functional-analytic aspects of Fourier transforms emphasized.

647, 648. Theory of Partial Differential Equations. (3 ea.)

Prerequisite: Math 323, 542 for 647; Math 647 for 648.

651, 652. General Topology 1, 2. (3 ea.)

Prerequisite: Math 552.

653R. Special Topics in Geometry. (3)

Prerequisite: Math 672.

Topics from n-dimensional projective and algebraic geometry, foundations, transformations, curves and surfaces, forms and sheaf theory.

655. Algebraic Topology 1. (3)

Prerequisite: instructor's consent.

656. Algebraic Topology 2. (3)

Prerequisite: Math 655.

661, 662. Functional Analysis. (3 ea.)
Prerequisite: Math 641 for 661; Math 661 for 662.

671, 672. Algebra. (3 ea.)
Prerequisite: Math 372 for 671; Math 671 for 672.

675R. Special Topics in Algebra. (3)
Prerequisite: Math 672.

676. Commutative Algebra. (3)
Prerequisite: Math 671, 672.
Commutative rings, modules, tensor products, localization, primary decomposition, Noetherian and Artinian rings, application to algebraic geometry and algebraic number theory.

677. Homological Algebra. (3)
Prerequisite: Math 671, 672.
Chain complexes, derived functors, cohomology of groups, ext and tor, spectral sequences, etc. Application to algebraic geometry and algebraic number theory.

687R. Topics in Analytic Number Theory. (3)
Prerequisite: Math 387, 372, and instructor's consent.
Current topics of research interest.

688R. Topics in Algebraic Number Theory. (3)
Prerequisite: Math 372, 387, 532, and instructor's consent.
Current topics of research interest.

695R. Readings in Mathematics. (1-2)

699R. Master's Thesis. (1-9)

751R. Advanced Special Topics in Topology. (3)
Prerequisite: instructor's consent and Math 651, 652.
Current topics in topology of research interest.

780R. Seminar in Algebraic Geometry. (3)
Topics selected from current research literature.

799R. Doctoral Dissertation. (Arr.)

FACULTY

ARMSTRONG, GERALD M., *Associate Professor.* PhD, University of Wisconsin, Madison, 1971. Real Analysis.

BAKER, ROGER C., *Professor.* PhD, University of London, 1971. Number Theory.

BARRETT, WAYNE WALTON, *Professor.* PhD, New York University, 1975. Matrix Theory; Graph Theory; Combinatorics.

BATES, PETER W., *Professor.* PhD, University of Utah, 1976. Nonlinear Partial Differential Equations; Dynamical Systems.

BRADY, THOMAS G., *Assistant Professor.* PhD, Cornell University, 1988. Geometric Group Theory.

CANNON, JAMES W., *Professor.* PhD, University of Utah, 1969. Geometric Topology; Geometric Group Theory.

CHAHAL, JASBIR S., *Associate Professor.* PhD, Johns Hopkins University, 1979. Number Theory.

CHATTERLEY, LOUIS J., *Professor.* PhD, University of Texas, Austin, 1972. Mathematics Education.

CLARK, DAVID A., *Assistant Professor.* PhD, McGill University, 1992. Number Theory.

CONNER, GREGORY R., *Assistant Professor.* PhD, University of Utah, 1992. Geometric Group Theory; Combinatorial Group Theory; Topology.

CRAWLEY, PETER L., *Professor.* PhD, California Institute of Technology, 1961. Infinite Groups.

FEARNLEY, LAWRENCE, *Professor.* PhD, University of London, 1970. Topology.

FORCADE, RODNEY W., *Professor.* PhD, University of Washington, 1971. Combinatorics.

GARBE, DOUGLAS G., *Associate Professor.* PhD, University of Texas, Austin, 1973. Mathematics Education.

GARNER, LYNN E., *Professor.* PhD, University of Oregon, 1968. Geometry; Commutative Algebra; Number Theory; Calculus Reform; Technology in Education.

GILL, GURCHARAN S., *Professor.* PhD, University of Utah, 1965. Functional Analysis.

GRANT, CHRISTOPHER P., *Assistant Professor.* PhD, University of Utah, 1991. Partial Differential Equations.

HANSEN, RICHARD A., *Professor.* PhD, University of Utah, 1965. Numerical Analysis.

HUMPHRIES, STEPHEN P., *Associate Professor.* PhD, University of Wales, 1983. Low-Dimensional Topology; Classical Groups.

JAMISON, RONALD D., *Professor.* PhD, University of Utah, 1965. Ordinary Differential Equations; Applied Mathematics; Mathematics Education.

LAMOREAUX, JACK W., *Professor.* PhD, University of Utah, 1967. Topology.

LANG, WILLIAM E., *Professor.* PhD, Harvard University, 1978. Algebraic Geometry.

LAWLOR, GARY, *Assistant Professor.* PhD, Stanford University, 1988. Minimal Surfaces.

LU, KENING, *Associate Professor.* PhD, Michigan State University, 1988. Applied Mathematics; Nonlinear Partial Differential Equations; Dynamical Systems.

LUNDQUIST, MICHAEL, *Assistant Professor.* PhD, Clemson University, 1990. Matrix Theory.

MCKAY, STEVEN M., *Assistant Professor.* PhD, Colorado State University, 1990. Numerical Analysis.

OUYANG, TIANCHENG, *Assistant Professor.* PhD, University of Minnesota, 1989. Partial Differential Equations.

POLLINGTON, ANDREW D., *Professor.* PhD, University of London, 1978. Number Theory.

ROBINSON, DONALD W., *Professor.* PhD, Case Institute of Technology, 1956. Linear Algebra.

SKARDA, R. VENCIL, *Associate Professor.* PhD, California Institute of Technology, 1965. Functional Analysis.

SMITH, WILLIAM V., *Professor.* PhD, University of Utah, 1978. Spectral Theory.

SNOW, DONALD RAY, *Professor*. PhD, Stanford University, 1965. Calculus of Variations; Functional Equations; Combinatorics.

SPEISER, ROBERT DAVID, *Professor*. PhD, Cornell University, 1970. Algebraic Geometry; Commutative Algebra.

TOLMAN, L. KIRK, *Associate Professor*. PhD, University of New Mexico, 1972. Graph Theory; Combinatorics; Ordered Rings and Fields; Differential Equations.

WALTER, CHARLES N., *Associate Professor*. PhD, University of New Mexico, 1970. Algebraic Geometry; Ordered Fields; Mathematics Education.

WILLIAMS, STEVEN R., *Assistant Professor*. PhD, University of Wisconsin, Madison, 1989. Mathematics Education.

WRIGHT, DAVID G., *Professor*. PhD, University of Wisconsin, Madison, 1973. Geometric Topology.

WYNN, JAN EUGENE, *Associate Professor*. PhD, Colorado State University, 1972. Padé Approximations.

MECHANICAL ENGINEERING

Chair: Alan R. Parkinson

Graduate Coordinator: Brent W. Webb

242-M CB
PO Box 24102
Provo, UT 84602-4102
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THE PROGRAM OF STUDIES

Mechanical engineering is a profession that provides broad service to society, whether in the development of new automobiles or in space exploration. All over the world the demand for technical knowledge and well-engineered products and services increases at phenomenal rates.

Postbaccalaureate education in engineering increases the engineering student's possibilities to become an integral part of this flourishing world of increasing engineering and technology needs. Among significant new experiences awaiting those who choose to return for advanced study is a closer and more personal relationship with the faculty. Research projects usually involve one-on-one collaboration with faculty members. Many graduate courses are synthesis classes, where the student has the opportunity to consolidate previous knowledge and bring together interdisciplinary aspects of design and research. Technical confidence and subject mastery can be greatly increased.

The Mechanical Engineering Department's goal is to provide the best advanced education possible for design, creative research, and synthesis in the spiritual atmosphere of the LDS Church-based culture.

Three degrees are offered through the Department of Mechanical Engineering: Mechanical Engineering—MS, Engineering Management—MEM, and Engineering—PhD. The MEM is administered by the College of Engineering and Technology but offered in

various departments, including the Mechanical Engineering Department.

The department also offers an integrated master's program, usually beginning in the junior year.

Some thirty to forty new graduate students are admitted each year. Program duration depends on the degree sought and how much a student may work. Nominal durations are 1.5 years for an MS degree and four years beyond a BS for a PhD.

Mechanical Engineering—MS

The MS degree can be directed toward research into new engineering knowledge or practice as well as advanced methods of engineering design.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 15 (U.S. and international); winter, September 15 (U.S. and international).
- Entrance examinations: international applicants must submit GRE general test and engineering subject test as well as TOEFL scores. U.S. applicants must prove to the department that they have passed the state fundamentals of engineering (FE, formerly EIT) examination, which the state of Utah (or any other state) offers each April and October.
- Prerequisite: BS degree in mechanical engineering or an allied discipline with approval; 3.0 GPA or above in last 60 hours for regular admission.

Requirements for Degree.

- Credit hours (34–40):
Thesis Option: minimum 34 hours including 9 thesis hours (MeEn 699R), MeEn 591R, and 6 hours of advanced mathematics or equivalent.
Nonthesis Option: minimum 40 course work hours including MeEn 591R and 6 hours of advanced mathematics or equivalent. A maximum 3 hours of project work, such

as 695R, may be included in the 40-hour total.

- Study list: each student must submit a study list of approved courses during the first semester.
- Prospectus: each student on the thesis option must submit a prospectus before beginning significant work on the thesis, preferably during the first semester.
- Residency requirements: residency is required for the major part of the work toward the master of science thesis. This work must be completed under the specific direction of a graduate faculty member while the student is in residence at BYU (at least two consecutive full-time semesters). "In residence" is defined as (1) being registered for credit as a graduate student and (2) living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty. Further, all work applying toward any master's project or thesis must be completely open for university review and publication. Any exceptions to the above must be supported by written approval from the department and college and obtained in advance of any work being performed.
- Examinations: FE examination or GRE (if not taken at time of admission); oral defense of thesis for thesis option candidates.
- Time requirement: one calendar year minimum.
- 3.0 minimum GPA in graduate study.

Engineering Management—MEM

The MEM is jointly sponsored by the Marriott School of Management and the College of Engineering and Technology. As such, the program incorporates increased technical learning in mechanical engineering (15 hours) with those skills needed to become an efficient and effective manager (25 hours). The type of career preparation gained with this focus will allow the student to remain in professional engineering activities and yet be capable

of working with managers or becoming a manager of technical activities.

The majority of MEM graduates go out as engineers, but the program more fully prepares them to move into management positions. The program offers the student an increased awareness of the interrelationship of engineering, marketing, production, finance, operations management, accounting, and other essential managerial skills.

Of the 15 hours taken in technical subjects, 9 must be in 500-level or higher mechanical engineering courses. The other 6 hours may be in 500-level or higher mechanical engineering courses or can be substantial courses of a technical nature in other technical departments. MEM students need to file a study list for these courses with the graduate coordinator.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 1 (U.S. and international). Fall semester entrance is strongly recommended. Entry spring and summer terms is available but will extend the length of the program.
- Application requirements: the entrance examination is the GRE general test for applicants from non-ABET (Accreditation Board for Engineering and Technology, Inc.) accredited institutions. U.S. applicants must prove to the department that they have passed the state fundamentals of engineering (FE, formerly EIT) examination, which the state of Utah (or any other state) offers each April and October. Indicate in writing a desire to be considered for the program. Submit application to Graduate Admissions, B-356 ASB, PO Box 21341, Provo, UT 84602-1341.
- Prerequisite: baccalaureate degree in engineering.

Requirements for Degree.

- Credit hours (40): minimum 40 course work credit hours.
- Basic curriculum requirements: *fall semester*—Mgt 501 (3), 561 (3),

EngT 500 (1), technical electives (6); *winter semester*—Mgt 511 (3), 541 (3), 562 (3), EngT 501 (1), technical elective (3); *spring term*—Mgt 551 (3), technical elective (3); *summer term*—Mgt 580 (3), 565 (2), technical elective (3). See p. 116 for course descriptions.

Financial Assistance.

Scholarship funds are available from the Jerry Christiansen Scholarship funds.

Engineering—PhD

Study at the PhD level intensifies as faculty relationships become more professional and intense, often resulting in close friendships. Course work can be even more stimulating as it becomes apparent that material is not necessarily laid out neatly. Sometimes questions are raised without formal answers. This often leads to individualized research that raises technical maturity.

The PhD program is directed toward the creation of new knowledge. Each dissertation is expected to be a defense of new engineering practice, design, or knowledge and is expected to result in peer-reviewed archival publications. It is in this program that the excitement of new knowledge frontiers are examined and placed before the world.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 15 (U.S. and international); winter, September 15 (U.S. and international). U.S. applicants—entry all terms and semesters; international applicants—fall semester entry preferred.
- Entrance examinations: FE (score of 70 percent) or GRE general test and advanced engineering subject test; TOEFL (score of 577 minimum).
- Prerequisite: BS degree (or equivalent) in mechanical engineering from a program accredited by the Accreditation Board for Engineering and Technology (ABET) with a mini-

mum 3.0 GPA in the last 60 hours of technical and scientific course work. A BS in any other field requires provisional admission. Consult the department for specific details.

Requirements for Degree.

- Credit hours: minimum 68 semester hours, at least 50 of which must be course work beyond the baccalaureate degree, plus 18 hours of dissertation (MeEn 799R).

Candidates Without a Master's Degree: of the 50 hours, a minimum 38 hours must be graduate-level courses. At least 12 hours of the 50 must be advanced mathematics or statistics (a portion of which may be upper-division undergraduate level with specific departmental approval) and a minimum 18 hours of dissertation (MeEn 799R).

Candidates with a Master's Degree: with committee approval, up to 20 hours of previous graduate work, including 4 hours of thesis, may apply toward the doctorate. In addition, other courses taken in the master's program may apply toward the required 12 hours of advanced mathematics or statistics.

- Foreign language and skill requirement: students wishing to use language or a combination of language and skill subjects to meet this requirement should confer with the department. Students taking the skill option must complete at least 18 hours of integrated study in mathematics beyond college trigonometry (Math 111 at BYU) or statistics. The 12 hours of advanced mathematics or statistics required for candidates without a master's degree is in addition to this skill requirement, which is normally fulfilled in undergraduate programs.
- Study list: the graduate study list must be submitted during the first semester of doctoral study.
- Residency requirements: see residency requirements listed in preceding Mechanical Engineering—MS section.
- Comprehensive qualifying examination: written and oral examination given in March and September each year. The examination must be

taken in the first year of the PhD program (usually after an MS degree) and can be retaken only once at the next offering. Students must apply in writing, one month in advance, to take the examination.

- Prospectus: submit and successfully defend a written prospectus on the proposed dissertation research topic at least one year before completion of the degree.
- Dissertation.
- Oral defense of dissertation.

Integrated Master's Program—BS/MS

Students who desire to obtain a master's degree in engineering, and who have been accepted to a department professional program, may elect to enter the integrated master's program at the end of the sophomore year or during the junior year of the engineering curriculum. The purpose of the program is to afford greater flexibility in scheduling course work than is normally available through a traditional BS degree followed by an MS degree program.

In this program the BS degree may be received before or simultaneously with the MS degree (normally five years from freshman matriculation). Specific requirements are the same as those listed for the mechanical engineering MS but include the following:

Admission and Entry.

- Application deadlines: formal application for admission to the program must be submitted to the Office of Graduate Studies at beginning of the junior year. Admission to graduate school must occur before taking final 30 hours of course work. Application to graduate school must meet usual university graduate application deadlines.
- Application requirements: cumulative 3.0 GPA for previous 60 hours of course work.

Requirements for Degree.

- Cumulative 3.0 GPA or above in all courses to be counted toward master's degree.

- Study list: for both BS and MS programs must be filed at beginning of junior year.

FINANCIAL ASSISTANCE

The department offers research and teaching assistantships for graduate students. Graduate internships and tuition awards are also available for qualified students, but normally through a major professor. Select tuition scholarships are provided from industrial firms, as well.

Application for all awards may be obtained from the department and should be returned by March 15 for consideration for the following fall semester. Write to the Department of Mechanical Engineering.

RESOURCES AND OPPORTUNITIES

The College of Engineering and Technology, of which the Department of Mechanical Engineering is a part, has experienced rapid growth in funded research during the past decade. In recent years the college research budget has continued to grow steadily, with the budget for the 1994-95 fiscal year exceeding \$9 million. A national leader in several areas, college research organizations now have two centers: the Advanced Combustion Engineering Research Center (ACERC) and the Advanced Composites Manufacturing and Engineering Center (ACME). This includes one of the prestigious National Science Foundation engineering research centers, four research laboratories, and two state-funded Centers of Excellence. More than half the faculty participate in research endeavors, and a number have gained international recognition for their work. Listed below are the resources most pertinent to the Department of Mechanical Engineering:

Combustion Laboratory. Organized in 1977 to bring together faculty who shared common research interests, the Combustion Laboratory maintains one of the most active and extensive combustion programs in the United

States. This laboratory provided the basis for the creation of ACERC, and it continues to function as an important part of that organization. Research activities are broad and well funded and presently include coal combustion, pollutant formation, coal gasification, turbulent mixing, dust explosions, and the modeling of gaseous and particle-laden combustion processes. Direction is given to the Combustion Laboratory by Dr. L. Douglas Smoot as part of his activities with ACERC.

Engineering Design Methods Laboratory (EDML). EDML was formed by an interdisciplinary group of faculty and graduate students whose common interest is the development of strategies, software tools, and understanding for increased productivity in engineering design. EDML is housed in the Mechanical Engineering Department under the direction of Alan R. Parkinson. Researchers associated with the laboratory emphasize the study of generalized methods to attack a wide range of design problems. Included among these are strategies for designing complex systems, software systems for engineering design, effective design teams, design/manufacturing interfaces, and modeling of systems for design.

Other Facilities and Resources. Along with major computer and computer-graphics facilities, the department also runs two well-equipped machine shops, one for specialized research services.

Faculty research areas include: combustion; computer-aided design; controls; design methods; dynamic systems; fluid mechanics; heat transfer; internal combustion engines; machining; manufacturing systems; mechanisms; metallurgy; optimization; robotics.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500. (MeEn-CEEn) Design and Materials Applications. (3)

Prerequisite: CEEn 203; MeEn 372 or CEEn 321.

Applied and residual stress; materials selection; static, impact, and fatigue strength; fatigue damage; surface treatments; elastic deflection and stability—all as applied to mechanical design.

501. (MeEn-CEEn) Stress Analysis and Design of Mechanical Structures. (3)

Prerequisite: CEEn 321 or MeEn 372.

Stress analysis and deflection of structures; general bending and torsion with computer applications to mechanical and aerospace structure design.

502. (MeEn-CEEn) Plasticity and Fracture Mechanics. (3)

Prerequisite: MeEn-CEEn 503.

Continuum theory of plasticity, linear elastic fracture mechanics, introduction to structured continuum theories for polycrystalline media.

503. (MeEn-CEEn) Theory of Elasticity. (3)

Prerequisite: CEEn 203, Math 321.

Tensor notation, stress and deformation tensors, constitutive equations, field equations; plane-stress/plane-strain, plate, axisymmetric, thermoelasticity, and large deformation problems.

504. (MeEn-CEEn) Matrix Structural Analysis. (3)

Prerequisite: CEEn 321 or MeEn 372.

Matrix notation, principle of virtual forces, flexibility method, principle of virtual displacements, stiffness method, and general purpose computer programs for structural analysis.

506. (MeEn-CEEn) Introduction to Finite Element Methods. (3)

Prerequisite: CEEn 321 or MeEn 372; MeEn-CEEn 501 or 504; or instructor's consent.

Finite element stress analysis; mathematical foundations; simplex, isoparametric, bending, and axisymmetric elements; basic 2-D and 3-D modeling techniques; use of FEA computer software and hardware.

507. (MeEn-CEEn) Advanced Finite Element Analysis. (3)

Prerequisite: CEEn-MeEn 506

Complex 3-D finite element modeling, multiple element types, and mesh generation techniques. Application to thermal stress, nonlinear materials, and large deformations. Use of CAE software.

508. (MeEn-CEEn) Dynamics of Structures and Mechanical Systems. (3)

Prerequisite: Math 321; CEEn 321 or MeEn 372; MeEn 504.

Dynamic analysis of single and multi-degree-of-freedom systems. Ritz approximation, frequency domain analysis, geometric nonlinearity, and material nonlinearity.

509. (MeEn-CEEn) Spectral Analysis of Dynamic Systems. (3)

Prerequisite: Math 321, CEEn 204.

Vibrations of elastic bodies and of systems with multiple degrees of freedom; random vibration. Computer-aided vibration testing and analysis.

510. Compressible Fluid Flow. (3)

Prerequisite: MeEn 312.

One-dimensional analysis of compressible flow with area change, friction, heat transfer, shock waves, and combined effects, including experimental methods.

511. Intermediate Compressible Flow. (3)

Prerequisite: MeEn 510.

Subsonic, transonic, and supersonic multidimensional flow. Basic equations; small perturbation theory; method of characteristics for steady and unsteady flow.

512. Boundary Layer Theory. (3)

Prerequisite: MeEn 312 or instructor's consent.

The stress tensor; Navier-Stokes equations; exact solutions for classical flows; Prandtl's boundary layer equations; separation; Karman-Pohlhausen integral methods; approximate solutions, numerical solutions, and applications.

515. Applied Aerodynamics and Flight Mechanics. (3)

Prerequisite: MeEn 312.

Modern applied aerodynamics, including performance, stability, and control of aerospace vehicles.

521. Energy Resources and Conversion. (3)

Prerequisite: MeEn 322 or instructor's consent.

New and conventional energy resources and energy conversion systems using principles of thermodynamics.

531. Design of Control Systems. (3)

Prerequisite: MeEn 435.

Classical frequency response and time domain design of control systems. State variable control and computer simulation of control systems.

534. Dynamic System Analysis and Design. (3)

Prerequisite: MeEn 435.

Lumped models of mechanical, electrical-mechanical, fluid, and thermal systems; graphic models; physical system response; computer simulation; design of dynamic systems.

537. Advanced Mechanisms. (3)

Prerequisite: MeEn 337.

Kinematics and dynamics of advanced mechanisms such as robots with computer simulation of mechanism motion.

541. Numerical Heat Transfer. (3)

Prerequisite: MeEn 440; Math 311 or instructor's consent.

Heat transfer analysis by numerical methods. Finite difference and finite element methods, stability and error analysis, using digital computers.

542. Design of Heat Transfer Systems. (3)

Prerequisite: MeEn 440.

Design of devices where heat transfer is a predominate effect; practical problems from industry; energy-conservation economics.

553. (MeEn-MFET) Mechanical Behavior of Polymers. (3)

Prerequisite: CEEn 203, MFE 355, or instructor's consent.

Generalized elasticity relations, viscoelasticity, yielding and fracture, crazing, rubber elasticity, anisotropic behavior, processing effects on optical and other properties.

554. Advanced Manufacturing Processes. (3)

Prerequisite: MeEn 250 or instructor's consent.

Analysis of forming, machining, welding, and casting processes, emphasizing metal microstructures. Selection of process parameters, considering economics and material properties.

556. Composite Material Design. (3)

Prerequisite: MeEn 250.

Macro- and micromechanical analysis and design of uni- and multidirectional composite materials.

557. Corrosion. (3)

Prerequisite: Chem 105.

Basic principles, eight common forms of corrosion, testing, materials, applications, modern theory, and high-temperature metal-gas reactions.

570. (MeEn-CEEn) Computer-Aided Engineering Software Design. (3)

Prerequisite: C or similar computer language background.

Programming techniques and structure for interactive engineering design software. Use of engineering library utility routines for user interface, graphics, and data access. Term project required.

571. (MeEn-CEEn) Engineering Computer Graphics and Software Design. (3)

Prerequisite: FORTRAN, C, or similar computer language background.

Application of modern computer graphics techniques to engineering problems, 2-D and 3-D transformations, perspective, hidden surface removal, lighting and shading. Graphics data structures, standards, and device independency. Software design methodology. Term project required.

572. (MeEn-CEEn) Computer-Aided Geometric Design. (3)

Prerequisite: FORTRAN, C, or similar computer language background.

Mathematical theory of free-form curves and surfaces and solid geometric modeling. B-spline and B-spline curve and surface theory, parametric and implicit forms, intersection algorithms, topics in computer algebra, free-form deformation. Several programming projects required.

573. CAD Software Development. (3)

Prerequisite: advanced FORTRAN or C.

Theory and development of CAD 2-D and 3-D systems, including programming of curves, surfaces, solids, data fitting, and CAD interfaces.

574. Advanced Continuum Mechanics and Geometric Modeling. (3)

Prerequisite: Math 313 or equivalent.

Fundamentals of continuum mechanics related to advanced geometric modeling. Solution for PDE; advanced geometric modeling in differential geometry, topology, and computational geometry; advanced design methods.

575. (MeEn-CEEn) Optimization Techniques in Engineering. (3)

Prerequisite: Math 321 and FORTRAN, C, or similar computer language background.

Application of computer optimization techniques to constrained engineering design. Theory and use of state-of-the-art computer routines. Robust design methods.

576. Advanced Methods for Engineering Design. (3)

Prerequisite: MeEn 475.

Emerging design methodology and design strategies for complex systems, including decomposition methods, sensitivity analysis, robust design, and expert systems in engineering design.

581. Internal Combustion Engines. (3)

Prerequisite: MeEn 322.

Computer modeling of performance and fuel economy, including exhaust emissions of spark-ignition and compression-ignition engines. Theoretical and actual cycles. CFR and production engine dynamometer testing.

584. Gas Turbine and Jet Engine Design. (3)

Prerequisite: MeEn 312, 322.

Design and synthesis of land-based and aircraft gas turbines utilizing fluid flow and thermodynamic fundamentals. Extensive discussion of turbojets, turbofan, and turboprop engines.

591R. Seminar. (1)

Graduate seminar to develop oral and written skills for presentation of current topics in mechanical engineering.

595R. Special Topics in Mechanical Engineering. (Arr.)

Prerequisite: departmental consent.

611. Theories of Fluid Turbulence. (3)

Prerequisite: MeEn 312, Math 321.

Theoretical and experimental study, including statistical and phenomenological models. Analyzing classical flow equations using Reynolds convention.

612. Principles of Ideal-Fluid Dynamics. (3)

Prerequisite: MeEn 312, Math 321.

Ideal-fluid hydrodynamics and aerodynamics, including ideal-fluid assumptions, rotational and irrotational flow, acyclic and cyclic motion, circulation, and lift.

631. Advanced Automatic Control Applications. (3)

Prerequisite: MeEn 531.

Mechanical control system analysis by computer methods; nonlinear methods; applications of modern control theory and computer controllers.

637. Dynamics in Mechanical System Design. (3)

Prerequisite: MeEn 531 or 534.

Applied design analysis of complex systems needing evaluation of vibrations, transient response, and/or feedback control. Classical, modern, and computer techniques.

641R. Special Topics in Heat-Transfer Theory. (3)

Prerequisite: MeEn 440.

Analysis of heat transfer in conduction, convection, or radiation.

642. Radiative Heat Transfer. (3)

Prerequisite: MeEn 440 or equivalent.

Engineering analysis of radiant heat exchange between surfaces, in enclosures, and in absorbing, emitting, and scattering media.

643. Convective Heat Transfer. (3)

Prerequisite: MeEn 440 or equivalent.

Engineering analysis of convective heat transfer in internal and external laminar and turbulent flows.

651. Advanced Topics in Manufacturing. (3)

Prerequisite: MeEn 554 or instructor's consent.

Presentation and evaluation of advanced aspects of material behavior, forming, welding, casting, and machining.

655. Polymer Processing. (3)

Prerequisite: MeEn 312, MFE 355, or instructor's consent.

Rheology and transport phenomena involving polymeric fluids. Analysis of extrusion, calendaring, die forming, mixing, compression and injection molding, filament winding, and pultrusion.

692R. Materials Seminar. (0.5)

Prerequisite: graduate standing in engineering or scientific field.

Advanced topics in materials science and engineering.

695R. Special Problems for Master's Students. (1-3)

Prerequisite: department chair's consent.

697R. Research. (6-9)**699R. Master's Thesis. (1-9)****791R. Seminar for Doctoral Students. (1)****795R. Selected Topics in Mechanical Engineering. (1-3)****799R. Doctoral Dissertation. (1-18)****FACULTY**

CANNON, JOHN N., *Professor.* PhD, Stanford University, 1965. Fluids; Combustion; Thermodynamics.

CHASE, KENNETH W., *Professor.* PhD, University of California, Berkeley, 1972. Computer-Aided Design for Manufacturing.

COX, JORDAN, *Assistant Professor.* PhD, Purdue University, 1991. Computer-Aided Engineering.

DAINES, RUSSELL L., *Assistant Professor.* PhD, Pennsylvania State University, 1995. Computational Fluid Dynamics.

EASTMAN, PAUL F., *Associate Professor.* PhD, University of Utah, 1965. Ceramics; Polymer and Composite Materials; Aerodynamics.

EVANS, MARK S., *Associate Professor.* PhD, Rensselaer Polytechnic Institute, 1987. Dynamics; Robotics.

FREE, JOSEPH C., *Professor.* PhD, Massachusetts Institute of Technology, 1967. Dynamic Systems; Modeling; Automatic Controls; Design Methods for Complex Systems.

GERMANE, GEOFFREY J., *Professor. PhD*, Brigham Young University, 1978. Combustion System Design; Internal Combustion Engines; Automotive Engineering; Thermodynamics.

HEATON, HOWARD S., *Professor. PhD*, Stanford University, 1963. Heat Transfer; Fluid Mechanics.

HOWELL, LARRY L., *Assistant Professor. PhD*, Purdue University, 1993. Compliant and Rigid Body Mechanisms; Solid Mechanics.

JENSEN, C. GREGORY, *Assistant Professor. PhD*, Purdue University, 1993. Computer Graphics Software; Database Development; Machining.

MAGLEBY, SPENCER P., *Associate Professor. PhD*, University of Wisconsin, Madison, 1988. Computer-Aided Design, Manufacturing; Intelligent Design Systems.

MCLAIN, TIMOTHY W., *Assistant Professor. PhD*, Stanford University, 1995. Dynamic Systems; Controls; Robotics.

MORTENSEN, KAY S., *Professor. PhD*, University of Utah, 1967. Materials; Expert Systems; Design Methods.

PARKINSON, ALAN R., *Professor. PhD*, University of Illinois, 1982. Optimization; Computer-Aided Engineering; Robust Design Methods.

QUEIROZ, MARDSON, *Associate Professor. PhD*, Carnegie-Mellon University, 1987. Combustion.

RAISOR, E. MAX, *Professor. MS*, Brigham Young University, 1975. Interactive Computer Graphics.

RED, W. EDWARD, *Professor. PhD*, Arizona State University, 1972. Robotics; Automation; Applied Mechanics.

SIMMONS, VAL E., *Associate Professor. PhD*, Utah State University, 1970. Mechanisms; Machine Design.

SMITH, CRAIG C., *Professor. PhD*, Massachusetts Institute of Technology, 1978. Dynamic Systems and Controls; Automation; Auto Safety.

SORENSEN, CARL D., *Associate Professor. PhD*, Massachusetts Institute of Technology, 1985. Design for Manufacture; Manufacturing Processes.

TREE, DALE, *Assistant Professor. PhD*, University of Wisconsin, 1992. Combustion; Internal Combustion Engines.

ULRICH, RICHARD D., *Professor. PhD*, Purdue University, 1959. Fluids; Thermodynamics.

WEBB, BRENT W., *Associate Professor. PhD*, Purdue University, 1986. Heat Transfer.

MICROBIOLOGY

Chair: Donald N. Wright

Graduate Coordinator: F. Brent Johnson

887 WIDB
PO Box 25253
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THE PROGRAM OF STUDIES

Graduate studies in microbiology and molecular biology emphasize a combination of both course work and research experience. The department faculty provide current theory and informational material in a broad collection of courses and mentor graduate students in purposeful research efforts that lead to publication of research work in leading science journals. Completion of degree programs in the department qualify our graduates for further graduate study at other universities; employment in educational, industrial, medical and research institutions; or postdoctoral research opportunities leading to careers as productive research or academic scientists.

The Department of Microbiology offers two degrees: Microbiology—MS and Microbiology—PhD. The department also offers an integrated degree, Microbiology—BS/MS, and the two following interdepartmental degrees:

Molecular Biology—MS and Molecular Biology—PhD

Areas of specialization include:

- Microbiology—MS: Clinical Laboratory Science, Immunology, Microbiology, Physiology, and Virology.
- Microbiology—PhD: Immunology, Microbiology, Physiology, and Virology.

Typically, there are from twenty to thirty graduate students in the department at any one time. Approximately one-third of them are PhD students and the remainder are MS students

and students in the BS/MS integrated program. Average times in the programs are about two years for an MS degree, about three years beyond the master's for the PhD degree, and about five years for the PhD, going directly from the bachelor's without the master's degree.

Admission and Entry.

All graduate programs in microbiology have the same admission and entry requirements:

- Semesters of entry and application deadlines: fall (preferred), February 1 (U.S. and international); winter, June 30 (U.S. and international).
- Entrance examination: GRE general test.
- Statement of intent must explicitly state field of interest and career goals.

Microbiology—(BS/MS Integrated)

The integrated microbiology program is a five-year curriculum during which students simultaneously work for both the BS and MS in microbiology. The purpose of this program is to increase flexibility of course scheduling, decrease the time normally necessary to complete both degrees independently, and increase opportunity for student laboratory research. The specific requirements for this program are basically the same as those for the MS degree in microbiology but include the following:

Admission and Entry.

- Program applications must be received during the sixth semester of study. Students unable to complete all course requirements by the end of a total of five years of matriculation will not be accepted.
- Applicants must have a minimum 3.3 cumulative GPA and no grade lower than a B in major or supportive science courses.

Requirements for Degree.

- Credit hours: minimum 158 credit hours including 30 hours of graduate-level (500 or 600) courses,

of which 6 thesis hours (Mcbio 699R) are required.

- Required courses: Math 119, Stat 222, Mcbio 130, Phscs 105, 106, 107, 108, Chem 105, 106, 107, 226, 351, 352, 353, 481, 689, Zool 503, Mcbio 230, 265, 291, 351, 365, 402, 403, 404, 425, 430, 441, 442, 481, 502, 504; 691R each semester after acceptance; an additional 18 hours must be completed from graduate-level courses including 695R.
- Minor (optional): any approved minor in biological or physical science.
- One semester of approved teaching experience.
- Thesis: standard university thesis or journal publication format.
- Examinations: (A) oral examination on thesis and (B) oral examination on course work.

Microbiology—MS

Admission and Entry.

- See preceding general requirements.
- Prerequisite: baccalaureate degree in microbiology or equivalent discipline; one year of inorganic chemistry (including laboratory); one semester of quantitative analysis; one year of organic chemistry; one year of general physics at Phscs 105 level or higher; one semester of calculus (Math 119 or equivalent); Mcbio 351, 402, 403, 404, or equivalent.

Requirements for Degree.

- Credit hours (30 hours): minimum 24 course work hours plus 6 thesis hours (Mcbio 699R).
- Required courses: Mcbio 691R (attendance required each semester of residence), Chem 481, Zool 503.
- Minor (optional): any approved minor in biological or physical science.
- Approved teaching experience of one semester.
- Thesis: standard university thesis or journal publication format.
- Examination: (A) oral examination on thesis and (B) oral examination on course work.

Molecular Biology—MS

Admission and Entry.

See preceding general requirements. Additionally, application should be made to the Molecular Biology Program, designating microbiology as the specialization of study. See Molecular Biology section of this catalog.

Requirements for Degree.

- Prerequisite: baccalaureate degree in microbiology or equivalent discipline; one semester of quantitative analysis; one year of organic chemistry; one year of general physics at Phscs 105 level or higher; one semester of calculus (Math 119 or equivalent)
- Required courses: for minimum degree requirements see Molecular Biology section of this catalog. Additional departmental course requirements include Zool 503, Mcbio 404, 561; Mcbio 691R each semester.

Microbiology—PhD

Admission and Entry.

See preceding general requirements.

Requirements for Degree.

- Credit hours: candidates without a master's degree: 54 semester hours beyond baccalaureate, including no more than 18 hours of dissertation credit. Minimum 36 hours beyond master's degree, including 18 hours of dissertation (Mcbio 799R).
- Required courses: Chem 367 or 461; 481; Mcbio 561, 691R (attendance required each semester of residence); Zool 503.
- Minor (optional): any approved minor in biological or physical science.
- Two semesters of approved teaching experience.
- Written qualifying examination before selection of dissertation topic (may be waived if bachelor's or master's degree was obtained from BYU).
- Skill requirement: experience in statistics required and other courses as required by the graduate committee
- Dissertation: standard university dissertation or journal publication format.

- Examinations: (A) written and oral comprehensive examination on completion of skill requirement and all course work and (B) oral defense of dissertation.
- Two semesters of registration are required following successful completion of the comprehensive examination.

Molecular Biology—PhD

Admission and Entry.

See preceding general requirements. Application should be made to the Molecular Biology Program, designating microbiology as the specialization of study. See Molecular Biology section of this catalog.

Requirements for Degree.

- Credit hours: candidates without a master's degree: 54 semester hours beyond baccalaureate including no more than 18 hours of dissertation credit. Minimum 36 hours beyond master's degree, including 18 hours of dissertation (Mcbio 799R).
- Required courses: for minimum degree requirements see Molecular Biology section of this catalog. Additional departmental course requirements include Mcbio 632; 691R each semester; Chem 367 or 461, Zool 503, and one of Mcbio 502, 611, 504, or 551.
- Minor: only approved minor in biological or physical science. None is required.
- Two semesters of approved teaching experience.
- Written qualifying examination before selection of dissertation topic (may be waived if bachelor's or master's degree were obtained from BYU).
- Skill requirement: experience in statistics required and other courses as required by the graduate committee
- Dissertation: standard university dissertation or journal publication format.
- Examinations: (A) written and oral comprehensive examination on completion of skill requirement and all course work; (B) oral defense of dissertation.

- Two semesters of enrollment are required after successful completion of the comprehensive examination.

FINANCIAL ASSISTANCE

The department offers to qualified students financial assistance in the form of teaching or research assistantships, fellowships, scholarships, or tuition waivers.

RESOURCES AND OPPORTUNITIES

Electron Optics Laboratory. In the Electron Optics Laboratory researchers can accomplish all standard electron optics procedures. The laboratory has transmission and scanning electron microscopes equipped with X-ray microanalysis capabilities, plus accessory equipment for freeze-fracture, freeze-drying, and necessary support facilities, including confocal laser scan microscopy.

Miscellaneous Campus Facilities. On the Provo campus are greenhouses, gardens, an arboretum, a small animal vivarium, and a tissue culture room. Laboratory facilities include gas chromatography-mass spectrometers, isotope ratio mass spectrometers, transmission and scanning electron microscopes, ultracentrifuges, visible ultraviolet and infrared spectrophotometers, gas chromatographs, high-performance liquid chromatographs, infrared gas analyzers, atomic absorption spectroscopy, polymerase chain reaction thermocyclers, flow cytometers, and many other items.

Faculty research interests currently include: clinical microbiology; clinical laboratory science; immunology; molecular biology and genetics; oncology; parasitology; physiology; virology.

For a more detailed description of the graduate program requirements, send for a copy of the department's graduate student handbook.

COURSE DESCRIPTIONS

502. Immunobiology. (4)

Prerequisite: Mcbio 402 or equivalent.

Literature review of current topics in immunology.

504. Molecular Biology of Animal Viruses. (4)

Prerequisite: Mcbio 404 or equivalent.

Molecular aspects of viral replication and infection.

551. Microbial Physiology. (5)

Prerequisite: Mcbio 351, Chem 481.

561. Radioisotope Methods. (2)

Prerequisite: college physics.

601. Molecular Approaches to Microbial Pathogenesis. (2)

Prerequisite: Mcbio 403.

Mechanisms of pathogenesis in host-parasite relationships.

611. Cellular Immunology and Immunogenetics. (2)

Prerequisite: Mcbio 502.

629. Advanced Clinical Laboratory Science. (3)

Clinical techniques and their relationship to disease. Topics in hematology, microbiology, immunohematology, and clinical chemistry.

631. Molecular Mechanisms in Virology. (2)

Prerequisite: Mcbio 504; Chem 581 or equivalent.

Selected topics in molecular functions of animal viruses.

632. Cell and Tissue Culture Techniques. (2)

Prerequisite: Mcbio 504; Chem 581 or equivalent.

Advanced procedures in cell culture.

642. Molecular Biology of the Cell. (3)

Prerequisite: Mcbio 441.

Structure and function of the prokaryotic and eukaryotic cells at the molecular level. Emphasis on molecular aspects of membranes, cytoskeletons, organelles, cell-to-cell communication, and cell movement.

651R. Special Topics in Microbiology. (2–5)

652R. Special Topics in Clinical Laboratory Science. (1–2)

671. Clinical Correlation. (2)

Correlating laboratory data with the diagnosis, pathogenesis, progress, and treatment of disease.

691R. Graduate Seminar. (1)

695R. Research. (Arr.)

699R. Master's Thesis. (1–9)

99R. Doctoral Dissertation. (1–9)

FACULTY

ANDERSON, SHAUNA C., *Professor.*

PhD, University of Washington, 1984. Medical Technology; Clinical Chemistry.

HARKER, ALAN R., *Associate Professor.*

PhD, University of Utah, 1982. Microbial Physiology.

JENSEN, JAMES B., *Professor.* PhD,

Auburn University, 1976. Immunology; Parasitology.

JOHNSON, F. BRENT, *Professor.* PhD,

Brigham Young University, 1970. Virology.

LEAVITT, RONALD W., *Associate*

Professor. PhD, University of California, San Diego, 1975. Molecular Biology.

MCCLEARY, WILLIAM R., *Assistant*

Professor. PhD, University of California, Berkeley, 1990. Molecular Biology.

MURRAY, BYRON K., *Professor.* PhD,

Brigham Young University, 1971. Virology.

NORTH, JAMES A., *Professor.* PhD,

University of Utah, 1964. Virology.

O'NEILL, KIM L., *Professor.* DPhil, New

University of Ulster, Northern Ireland, 1986. Genetics; Oncology.

ROBISON, RICHARD A., *Assistant*

Professor. PhD, Brigham Young University, 1988. Molecular Biology; Immunology.

TEUSCHER, CORY, *Associate Professor.*

PhD, University of New Mexico, 1982. Immunology.

WOODWARD, SCOTT R., *Associate*

Professor. PhD, Utah State

University, 1983. Molecular Biology.

WRIGHT, DONALD N., *Professor.* PhD,

Iowa State University of Science and Technology, 1964. Clinical Microbiology.

MOLECULAR BIOLOGY

Program Coordinator: Donald N. Wright

775 WIDB

PO Box 25180

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THE PROGRAM OF STUDIES

Graduate study in molecular biology at Brigham Young University is an integrated multidisciplinary program. The MS degree can be taken through any department in the College of Biology and Agriculture (Agronomy and Horticulture, Animal Science, Botany and Range Science, Food Science and Nutrition, Microbiology, Zoology). The PhD degree can be taken through the Departments of Botany and Range Science, Microbiology, and Zoology. Students should refer to the department of interest for specific requirements.

Admission Requirements—MS and PhD Programs.

- Students wishing to obtain a graduate degree in molecular biology must make application to the Molecular Biology Program.
- Semesters of entry and application deadlines: February 1 for fall semester to receive full consideration for first-round acceptance and financial assistance.
- Entrance examination: GRE general test. Scores must be submitted with application to be considered for regular admission.
- **Note:** Statement of intent must explicitly state field of interest, department preference, and career goals.

Molecular Biology—MS

Admission and Entry.

- See preceding admission requirements.
- Prerequisite: baccalaureate degree in molecular biology or biological or physical science. One year of general university physics, mathemat-

ics equivalent to Math 119, one year of organic chemistry with laboratory, and one year of cell biology and genetics equivalent to Botny-Zool 341 and 342, or Mcbio 230 and 430.

Requirements for Degree.

- Credit hours (minimum 30): 24 course work hours plus 6 thesis hours.
- Minimum requirements include Chem 481, 582; Chem 586 or Mcbio 442; Stat 337 or 501; Mcbio 351, 425, 441, 442; Mcbio 642 or Zool 526.

See sponsoring department for departmental requirements.

Molecular Biology—PhD

Admission and Entry.

- See above application requirements.
- Prerequisite: baccalaureate degree in molecular biology or biological or physical science. One year of general university physics, mathematics equivalent to Math 119, one year of organic chemistry with laboratory, and one year of cell biology and genetics equivalent to Botny-Mcbio-Zool 341 and 342, or Mcbio 230 and 430.

Requirements for Degree.

- Credit hours: candidates without a master's degree: 54 semester hours beyond baccalaureate degree, including no more than 18 hours of dissertation credit. Minimum 36 hours beyond master's degree, including 18 hours of dissertation.
- Same minimum course requirements as for molecular biology MS.

See sponsoring department for departmental requirements.

FINANCIAL ASSISTANCE

Students seeking financial assistance should consult with the sponsoring department.

RESOURCES AND OPPORTUNITIES

This interdepartmental program has access to the resources of the sponsoring departments. For a complete list of the resources available, please refer

to these individual listings in this catalog.

Faculty and graduate students are currently engaged in a number of significant and interesting research projects, funded both externally and internally.

For a more detailed description of the graduate program requirements, send for a copy of the sponsoring department's bulletin.

COURSE DESCRIPTIONS

For a complete course listing, please refer to the sponsoring department.

FACULTY

For faculty listing, please refer to sponsoring department.

MUSIC

Chair: Clyn D. Barrus

Graduate Coordinator: Glenn R. Williams

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PO Box 26410
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THE PROGRAM OF STUDIES

The graduate programs of the Department of Music are designed to preserve and develop an art form that is essential to human progress and well-being and to provide advanced instruction in the art and craft of music.

The Department of Music provides graduate education in composition, music education, music history and theory, and music performance, and it maintains accreditation for all of its degree programs through the National Association of Schools of Music.

Three degrees are offered through the Department of Music: Music—MA, Music—MM, and Music—PhD. A music minor is also offered.

The Department of Music has an average enrollment of seventy graduate students from various U.S. and international areas. The average time for a student to complete a master's degree in music is two years.

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, summer, February 1 (U.S. and international). Fall and winter semesters only, except applicants for MM and MA in music education, who must enter summer term only.
- Application requirements: each applicant must submit specific materials relating to the applicant's intended specialization, which are reviewed by faculty members in the specialization. See specific areas. International students whose principal language is not English must

submit a sample research paper that demonstrates adequate ability to write in English. This paper should be submitted to the Department of Music at the time completed application forms are submitted to Graduate Admissions.

Music—MA

The master of arts degree is offered with specializations in music education and musicology. A student whose background exhibits deficiencies in academic areas of music may be required to complete additional prerequisite courses during the MA.

MA in Music Education. This specialization validates through research, experimentation, and connections among disciplines the effects of music in the human life process of such individuals as the handicapped person, the fetus, and the young child. Candidates examine issues related to music medicine, community music, adult music education, performance problems of musicians, music and the science of movement, and elementary or secondary education and apply this knowledge and art.

MA in Musicology. This program trains students to be teachers and scholars who will promote musical understanding and appreciation for the arts. It is expected that they will add to the body of historical and analytical publication that has increased understanding of the history, practice, sociology, and aesthetics of the cultural heritage of Western (and to a lesser degree non-Western) music. This effort should also increase awareness of cultural and historical diversity represented in concert programs and recordings.

Admission and Entry.

MA Music Education: submit the following with application:

- GRE music test score.
- Proposal for an experimental research study in the degree emphasis.
- Personal or telephone interview with the graduate music education faculty.

MA Musicology: submit the following with application:

- Graduate Record Examination (GRE) music test score.
- Sample scholarly research paper.
- List of publications, if any.

Requirements for Specialization—Music Education.

- Prerequisite: baccalaureate degree in music or equivalent.
- Credit hours (32): minimum 26 course work hours plus 6 thesis hours (Music 699R).
- Required courses: Music 501, 699R; 4 hours from Music 671, 672, 673, 674, 675; Stat 552.
- Electives: 8–10 hours from graduate music courses and 7–9 hours from graduate courses outside the music field.
- Thesis.
- Examinations: (A) comprehensive examination; (B) defense of thesis.

Requirements for Specialization—Musicology.

- Prerequisite: baccalaureate degree in music or equivalent.
- Credit hours (32): minimum 26 course work hours plus 6 thesis hours (Music 699R).
- Required courses: Music 500, 607A,B, 699R; any 12 hours from 601, 602, 603, 604, 605, 606.
- Electives: 8 hours.
- Minor (optional): consult with department.
- Thesis.
- Examinations: (A) department language proficiency examination in French, German, or Latin; (B) comprehensive examination; (C) defense of thesis.

Music—MM

The master of music degree is offered with specializations in Composition, Conducting, Music Education, and Performance.

MM in Composition. The purpose of this specialization is to produce graduates who are prepared to make a significant contribution to the art form, either as composers or as teachers and scholars in composition and

theory, and to provide aesthetic enrichment to both the composer and listener.

MM in Conducting. Students develop advanced, personal conducting skills and techniques that are precise and suited to a variety of musical needs; attain confidence, poise, and clarity with the baton; learn effective rehearsal techniques; and become familiar with a variety of instrumental and choral scores representing the repertoire of various music periods and sacred and secular styles. They learn to convey through gesture music's power and gentleness and its directness and subtlety to both the performer and audience and to select and bring to the community the great masterpieces of instrumental and choral literature.

MM in Music Education. This program aims to produce music educators who will be effective teachers and music leaders as well as advocates for the arts in their communities. Possessing a new and enriched perspective of what public music should be, they will be advocates and champions of musical excellence and be more effective in providing stimulating and satisfying musical experiences for students, while serving as exemplars to others in the profession.

MM in Performance. The intent of the specialization is to prepare students with outstanding performance potential to be competitive in performance and teaching careers and to be advocates for the arts in their communities. They may help meet the needs for skilled performers of solo and small and large ensemble music, and they will be able to teach privately and help meet the considerable community demand for excellent private studio teachers.

Admission and Entry.

MM Composition: submit the following with application:

- Portfolio of four compositions in various media.
- Recording of two or more of these compositions.

MM Conducting: submit the following with application:

- Programs of concerts presented and lists of pieces rehearsed as a conductor.
- High-quality recording and, if possible, a videotape recording of a representative performance of a group trained and conducted by the applicant.
- (a) Choral Emphasis: a personal or recorded performance that demonstrates the applicant's ability to play four-part homophonic and polyphonic music at the keyboard.
- (b) Instrumental Emphasis: an audio or video recording showing proficiency on the applicant's major instrument.

MM Music Education: submit the following with application:

- Photocopy of a valid teaching certificate.
- Written proposal of a possible master's project or thesis topic of interest to the applicant.
- Recording containing a representative performance of the applicant on the major instrument and a performance of a group trained and conducted by the applicant.

MM Performance: submit the following with application:

- Recital programs and repertoire lists from undergraduate study.
- Personal performance audition at Brigham Young University (preferred) or a recording of the senior recital or equivalent performance (acceptable).

Requirements for Specialization—Composition.

- Prerequisite: baccalaureate degree in music composition or equivalent in previous training.
- Credit hours (32): minimum 26 course work hours plus 6 master's composition hours (Music 688R).
- Required courses: Music 500, 503, 606, 687R (6 hours) 688R (6 hours); 3 hours from 601, 602, 603, 604, 605; 6 hours from 581, 583, 591, 596, 683.
- Electives: 3 hours.
- Recital: strongly recommended.
- Project.

- Examination: (A) final oral examination; (B) defense of project.

Requirements for Specialization—Conducting.

- Prerequisite: baccalaureate degree in music;
- Credit hours: minimum 32 course work hours.
- Required courses: Music 500, 600R (conducting, 4 hours), ensemble (2 hours), 697A,B.
Band Emphasis: Music 510, 532, 595, 606, and electives in addition to electives listed below (8 hours).
Choral Emphasis: Music 506, 507, 533R (4 hours), 664, and electives in addition to electives listed below (6 hours)
Orchestra Emphasis: Music 508, 509, 532, 595, and electives in addition to the electives listed below (6 hours).
- Electives: 6 hours (3 hours for band emphasis) in nonperformance music graduate courses (as approved by graduate committee) from one or more of the following areas: music education, music history, or music theory.
- Examinations: (A) jury examination each semester of enrollment in 660R; (B) repertoire examination; (C) final oral examination.
- Closure project: Music 697A, B.

Requirements for Specialization—Music Education.

- Prerequisite: public school music teacher certification; baccalaureate degree in music.
- Credit hours: minimum 32 course work hours including a professional improvement project (Music 698A,B).
- Required courses: Music 501, 595, 673, 674, 675; 6 hours from 532, 533R, 534R; 4 hours from 560R; 698A, B.
- Project.
- Examination: (A) comprehensive written examination; (B) final oral examination; (C) defense of project.

Requirements for Specialization—Performance.

- Prerequisite: baccalaureate degree in performance or equivalent; proficiency in German, French, and Italian diction for voice candidates.

ciency in German, French, and Italian diction for voice candidates.

- Credit hours: minimum 32 course work hours.
- Required courses: Music 500, 660R (6 hours), ensemble (2 hours).
Voice or Orchestral Instrument Emphasis: Music 505R, 665, 670R (2 hours), 694R in applied literature (2 hours), 697A, B (4 hours) or 649R (2 hours) and electives in addition to the electives listed below (4–6 hours).
Keyboard Instrument Emphasis: Music 505, 591, 665, 670R (2 hours), 694R in applied literature (2 hours), 649R (2 hours) or 697A,B (4 hours) and electives in addition to the electives listed below (2–4 hours). The ensemble requirement listed above includes 644R.
- Electives: 6 hours in nonperformance music graduate courses (as approved by graduate committee) from one or more of the following areas: music education, music history, or music theory.
- Examinations: (A) jury examination each semester of enrollment in 660R; (B) repertoire examination; (C) final oral examination.
- Closure project: the Music 697A,B sequence is the recommended closure project for the degree. With approval from the graduate committee, a student may select the solo recital (649R) option.

Music—PhD

The doctor of philosophy degree is offered with a specialization in musicology. A student's prerequisite master's degree would ordinarily be in the field of musicology or music history. Students with exceptional promise in other fields of music may also be considered for entrance, however, and are encouraged to apply.

PhD in Musicology. This program trains students to be teachers and scholars who will promote musical understanding and appreciation for the arts. It is expected that they will add to the body of historical and analytical publication that has increased understanding of the history, practice,

sociology, and aesthetics of the cultural heritage of Western (and to a lesser degree non-Western) music. This should also increase awareness of cultural and historical diversity represented in concert programs and recordings.

Admission and Entry.

PhD Musicology: submit the following with application:

- The Graduate Record Examination (GRE) music test score.
- A sample scholarly research paper.
- A list of publications, if any.

Requirements for Specialization—Musicology.

- Prerequisite: baccalaureate degree in music; master's degree in musicology or equivalent.
- Credit hours (86 beyond baccalaureate, 56–58 beyond master's): minimum 68 course work hours beyond the baccalaureate degree or 38–40 hours beyond the master's degree (subject to approval by the graduate committee), plus 18 dissertation hours (Music 799R).
- Required courses: Music 500, 596, 601, 602, 603, 604, 605, 606, 608A,B, 699R (thesis, 6 hours), 701A,B, 799R (dissertation, 18 hours).
- Cognate field requirement: 8 hours from a single cognate field outside the Department of Music (e.g., linguistics, philosophy, German literature, etc.).
- Language requirement: pass departmental examinations in French, German, and Latin (additional languages may be required by graduate committee if necessary for candidate's research).
- Dissertation.
- Examinations: (A) comprehensive examination; (B) oral defense of dissertation.

Music—Minor

The Department of Music follows the general university requirements established for the graduate minor. The student must:

- Obtain the approval of the department chair.

- Select a graduate faculty member (approved by the department chair) to serve as a graduate committee member.
- Register for and complete 9 semester hours of approved graduate credit in the minor.
- Pass an oral or a written comprehensive examination in the minor (prepared by the minor committee member).

FINANCIAL ASSISTANCE

The Music Department offers four types of graduate awards: assistantships, internships, performance awards, and scholarships. Application for financial aid is made on forms available from the Department of Music's graduate coordinator.

RESOURCES AND OPPORTUNITIES

The Harris Fine Arts Center, which houses the Department of Music, contains two concert halls and numerous practice rooms for music, dance, and theatre.

Graduate students have opportunities to perform individually and with groups in both the Madsen Recital Hall and the de Jong Concert Hall in the Harris Fine Arts Center.

For a more detailed description of the graduate program requirements, send for a copy of the department's graduate handbook.

COURSE DESCRIPTIONS

500. Musical Research Techniques. (2)
Prerequisite: graduate standing.

501. Music Education Research Techniques. (2)
Prerequisite: graduate standing.

503. Aesthetics. (3)
Fundamental questions of aesthetic theory from classical antiquity to the present, emphasizing musical aesthetics.

505R. Applied Literature. (2)
Prerequisite: minimum of one enrollment in Music 402–407.
Continuation of Music 402–407.

506. Choral Literature 1. (2)
Prerequisite: instructor's consent.
Concentrated analytical study and application of choral literature through Beethoven.

507. Choral Literature 2. (2)
Prerequisite: instructor's consent.
Concentrated analytical study and application of choral literature from post-Beethoven to the present.

508. Orchestra Literature 1. (2)
Prerequisite: instructor's consent.
Concentrated analytical study and application of orchestral literature of the baroque and classical eras.

509. Orchestra Literature 2. (2)
Prerequisite: instructor's consent.
Concentrated analytical study and application of orchestral literature of the romantic era and the twentieth century.

510. Band Literature. (2)
Prerequisite: instructor's consent.
Concentrated study of band literature through analysis and conducting.

532. Score Preparation and Conducting: Instrumental. (2)

533R. Score Preparation and Conducting: Choral. (2)

534R. Score Preparation and Direction: Jazz. (2)

560R. Performance Instruction. (2)
Prerequisite: graduate music major status.
Performance instruction for students not specializing in performance and for performance students wishing to study secondary instruments. \$200 fee.

570. Music for Elementary School Teachers. (2)

Prerequisite: Music 371, 471, or elementary music teaching experience.

Experiences in teaching various music activities in the elementary school.

571. Elementary Education Music Pedagogy. (2)

Prerequisite: Music 371 and equivalent of elementary education teaching minor in music.

Orff, Dalcroze, and Kodaly materials and techniques.

575R. Summer Music Workshops and Clinics. (1–4) On dem.**576. Fundamentals and Techniques of the Marching Band. (2)**

Prerequisite: Music 294, 296.

Planning, charting, and scoring for marching bands. For music education majors only.

581. Twentieth-Century Orchestration. (3)

Prerequisite: Music 481.

New techniques for standard and new instruments; analysis and listening.

583. Sixteenth-Century Counterpoint. (3)

Prerequisite: Music 483.

Strict modal counterpoint in sixteenth-century style (Palestrina); includes species, text setting, and motet.

591. Advanced Topics in Keyboard Harmony. (2)

Prerequisite: Music 407.

Topics vary.

595. Score Analysis. (2)

Analysis of representative choral and instrumental works from the Renaissance through contemporary styles.

596. Schenker Analysis. (3)

Prerequisite: Music 395 or equivalent.

Schenker's system of tonal analysis.

599R. Cooperative Education. (1–6)

Prerequisite: instructor's consent.

Internship in creative, performing, producing, or teaching applications of major course work.

600R. Topics in Music. (1–3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

601. Music in the Middle Ages. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

602. Music in the Renaissance. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

603. Music in the Baroque Era. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

604. Music in the Classic Period. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

605. Music in the Romantic Period. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

606. Music of the Contemporary Period. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

607A. Seminar in Musicology. (2)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

607B. Seminar in Musicology. (2)

Prerequisite: Music 607A.

608A. History of Notation and Paleography 1. (3)

Prerequisite: Music 301, 302, 303, 304, 601, or equivalent.

Notation from the early Christian chant to approximately 1400.

608B. History of Notation and Paleography 2. (3)

Prerequisite: Music 608A.

Offered same year as Music 608A. Notation from approximately 1400 to 1625, including tablatures.

614R. Concert Choir. (1)**615R. University Singers. (1)****619R. Music Theatre Performance. (1–3)****626R. Wind Symphony. (1)****634R. Synthesis. (1)****638R. Philharmonic Orchestra. (1)****639R. Chamber Orchestra. (1)****641R. Brass Chamber Music. (1)****642R. Early Music Ensemble. (1)****643R. Guitar Ensemble. (1)****644R. Keyboard Ensemble. (1)****645R. Percussion Ensemble. (1)****646R. String Chamber Music. (1)****647R. Vocal Chamber Music. (1)****648R. Woodwind Chamber Music. (1)****649R. Solo Recital. (2)**

Prerequisite: concurrent registration in Music 660R. Recital fee in addition to fee for private lessons.

660R. Performance Instruction: Major. (2)

Prerequisite: completion of undergraduate performance proficiency requirements and audition; primary instrument only. \$200 fee.

For performance specialization.

664. Choral Development. (2)

Prerequisite: instructor's consent.

Conducting and teaching skills as principles of choral artistry.

665. Pedagogy. (2)

Prerequisite: completion of appropriate undergraduate pedagogy courses or equivalent.

Advanced pedagogical studies.

670R. Supervised Teaching. (2)

Prerequisite: graduate music major status.

Supervised private and group instruction.

671. Influence of Music on Behavior. (2)

Variables that influence musical behavior and effects of music on nonmusical behavior.

672. Psychology of Music. (2)

Psychoacoustical properties of musical phenomena and the neurological aspects of music perception and performance.

673. Historical and Social Foundations of Music Education. (2)

Leaders, events, and trends in history of music education, emphasizing sociological implications.

674. Philosophical and Aesthetic Foundations of Music Education. (2)

Questions related to teaching music in the public schools.

675. Theories of Music Learning and Motivation. (2)

Applications of psychology to teaching and learning music. Research paper required.

683. Twentieth-Century Counterpoint. (3)

Prerequisite: Music 583.

Counterpoint from the works of Schoenberg, Stravinsky, Crumb, Lutoslawski, and others.

684. Advanced Fugue. (3)

Prerequisite: Music 483.

Fugues in Bach's *Well-Tempered Clavier* and other exemplary works.

687R. Composition. (3)**688R. Composition for Master's Degree. (1-6)**

Prerequisite: graduate music faculty's consent, based on evidence of ability in composition manifested in preliminary work.

694R. Independent Readings. (1-3)

Prerequisite: graduate committee's consent.

697A. Scholarly Paper for Master of Music Degree. (2)

Preparation of formal paper related to music of graduate recital. Supervised by a member of music history and literature faculty as directed by the student's graduate advisor.

697B. Recital. (2)

Prerequisite: Music 697A and graduate committee's and graduate music faculty's consent.

698A. Master's Project—Professional Improvement Project. (2)

Identifying and delineating a project. Study list constructed and advisor assigned.

698B. Master's Project—Professional Improvement Project. (2)

Presentation of project and written report.

699R. Master's Thesis. (1-9)

Prerequisite: department graduate faculty's consent.

700R. Seminar in Music. (1-3)

Prerequisite: Music 500 or 501 (or equivalent) and graduate committee's consent.

799R. Doctoral Dissertation. (1-9)

Prerequisite: department graduate faculty's consent.

FACULTY

ANDERSON, RICHARD PAUL, *Assistant Professor*. DMA, University of Colorado, 1986. Piano Pedagogy.

BACHELDER, DANIEL F., *Professor*. PhD, Brigham Young University, 1976. Trombone and Brass Performance/Pedagogy.

BARRUS, CLYN D., *Professor*. DMA, University of Michigan, 1971. Orchestral Conducting; Viola and String Performance/Pedagogy.

BEAN, MATTHEW W., *Assistant Professor*. DMA, Indiana University, 1991. Musical Dance Theatre.

BELNAP, PARLEY L., *Professor*. DMA, University of Colorado, 1975. Organ Performance/Pedagogy.

BLACKINTON, DAVID P., *Associate Professor*. DMA, Catholic University of America, 1975. Band Conducting; Trumpet and Brass Performance/Pedagogy.

BROUGH, RONALD P., *Assistant Professor*. MM, North Texas State University, 1983. Percussion Performance/Pedagogy.

BUSH, DOUGLAS E., *Associate Professor*. PhD, University of Texas, 1982. Musicology; Organ.

COOK, R. DONALD, *Assistant Professor*. DMA, University of Kansas, 1987. Organ Performance/Pedagogy.

DALTON, DAVID J., *Professor*. DM, Indiana University, Bloomington, 1970. Primrose International Viola Archive; Viola and String Performance/Pedagogy.

DAYLEY, K. NEWELL, *Professor*. DA, University of Northern Colorado, 1986. Brass Performance/Pedagogy.

DRINKALL, ROGER, *Professor*. MM, University of Illinois, 1962. Cello and String Performance/Pedagogy.

DURHAM, THOMAS L., *Professor*. PhD, University of Iowa, 1978. Theory/Composition.

GIOVANNETTI, GERALYN, *Assistant Professor*. DMA, University of Michigan, 1990. Oboe and Woodwind Performance/Pedagogy.

HICKS, MICHAEL D., *Associate Professor*. DMA, University of Illinois, 1984. Theory/Composition.

HOPKIN, J. ARDEN, *Associate Professor*. DMA, University of Rochester, 1978. Voice Performance/Pedagogy.

JACCARD, JERRY L., *Assistant Professor*. EdD, University of Massachusetts, 1995. Music Education.

JACKSON, BRET A., *Assistant Professor*. DMA, Arizona State University, 1994. Brass and Trumpet Performance/Pedagogy.

JESSOP, SCOTT GORDON, *Associate Professor*. PhD, Brigham Young University, 1980. Music Education.

JOHNSON, STEVEN P., *Assistant Professor*. PhD, University of California, Los Angeles, 1989. Musicology.

- JONES, STEPHEN M., *Assistant Professor*. DMA, University of Cincinnati, 1989. Theory/Composition.
- KENNEY, SUSAN HOBSON, *Associate Professor*. MA, Brigham Young University, 1978. Elementary Music Education.
- LOWE, LAURENCE M., *Associate Professor*. MM, University of Rochester, 1981. Horn and Brass Performance/Pedagogy.
- PEERY, IRENE W., *Assistant Professor*. DMA, Peabody Conservatory of Johns Hopkins University, 1987. Piano Performance/Pedagogy.
- PETERSON, DONALD L., *Associate Professor*. DMA, Arizona State University, 1986. Music Education.
- POLLEI, PAUL C., *Professor*. PhD, Florida State University, 1975. Piano Performance/Pedagogy.
- POWLEY, E. HARRISON, *Professor*. PhD, University of Rochester, 1974. Musicology.
- PRATT, ROSALIE REBOLLO, *Professor*. EdD, Columbia University, 1976. Music Education.
- RANDALL, DAVID M., *Professor*. DMA, University of Iowa, 1970. Clarinet and Woodwind Performance/Pedagogy.
- ROBISON, CLAYNE W., *Professor*. DMA, University of Washington, 1973. Vocal Performance/Pedagogy.
- SARGENT, DAVID H., *Professor*. DMA, University of Illinois, 1975. Theory/Composition.
- SHUMWAY, JEFFREY L., *Associate Professor*. DM, Indiana University, 1982. Piano Performance/Pedagogy.
- SMITH, RAYMOND, *Associate Professor*. DM, Indiana University, 1982. Saxophone and Woodwind Performance/Pedagogy.
- STAHELI, RONALD J., *Professor*. DMA, University of Southern California, 1977. Choral Conducting.
- STUART-BACHELDER, LILA R., *Professor*. DM, Indiana University, 1993. Vocal Performance/Pedagogy.
- WILBERG, MACK J., *Professor*. DMA, University of Southern California, 1985. Choral Conducting.
- WILLIAMS, GLENN R., *Professor*. DMA, University of Rochester, 1961. Bassoon and Woodwind Performance/Pedagogy.

NURSING

Dean: Sandra Rogers
Graduate Coordinator: Mary Williams

594 SWKT
 PO Box 28606
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 (801) 378-5626

THE PROGRAM OF STUDIES

The graduate program, administered by the College of Nursing, has four major goals: (1) to prepare expert clinicians in a nursing specialty; (2) to prepare leaders who implement changes in health care; (3) to prepare nurses who conduct research for solutions to clinical, educational, or administrative problems; and (4) to prepare nurses for doctoral study.

The College of Nursing is a member of the Council of Baccalaureate and Higher Degree Programs of the National League for Nursing, the American Association of Colleges of Nursing, and the Western Council on Higher Education in Nursing. The program is fully accredited by the National League for Nursing and approved by Utah State Board of Nursing.

The College of Nursing offers one degree in nursing: Nursing—MS. Two specialty areas are available: Family Nurse Practitioner and Nursing Administration. Qualified students may obtain the MS in nursing administration specialty jointly with the MBA or the MPA degrees. Contact the College of Nursing for details about these programs.

There are approximately sixty students enrolled, and they can complete the programs in two years, although five years is allowed.

Nursing—MS

The master of science degree program emphasizes clinical expertise and includes nursing theories and concepts as well as extensive clinical experience.

Research is an important component of the program, and students are required to write a thesis or develop an innovative project. Areas of specialization within the nursing program: Family Nurse Practitioner, Nursing Administration

Admission and Entry.

- Semesters of entry and application deadlines: spring term only, February 1 (U.S. and international).
- Recommendations: three letters of recommendation from former teachers or employers.
- Personal statement: brief (three pages or fewer) prepared statement of personal philosophy and goals for graduate education.
- GPA: minimum 3.0 GPA for last 60 hours.
- Interview.
- GRE general test.
- Resumé.
- Prerequisite: baccalaureate degree in nursing from an NLN-accredited program. Graduates from state-approved programs will be admitted on demonstration of professional proficiency equivalent to that of students from NLN-accredited programs.
- License: current RN licensure in Utah.
- Completion of basic statistics course.
- Transportation: candidates may be required to travel to gain experience in a variety of hospitals and clinics and to visit agencies and client homes; therefore, access to a car is necessary.
- Student malpractice: candidates are required to carry student liability insurance. The fee is \$12 per enrollment year, to be paid at the time of registration.

Requirements for Degree.

- Credit hours:
Nursing Administration Specialization (42): minimum 36 course work hours plus 6 thesis hours (Nurs 699R).
Family Nurse Practitioner Specialization (43–48): minimum 42 course work hours plus 6 thesis hours (Nurs 699R) or 42 course work hours plus 6 project hours (Nurs 698R).
- Required courses:
Nursing Administration Specialization: Nurs 580, 600, 601, 602, 603; 611,

612, 613, 614; 699R; MBA 500, 501; PMgt 603, 634, 643, 660; IS 301.

Family Nurse Practitioner Specialization: Nurs 551, 555, 557, 600, 601, 602, 603, 620, 622, 625, 630, 632, 635; 698R or 699R.

- Electives: determined in consultation with graduate committee.
- Thesis: thesis or project.
- Examination: oral defense of thesis or project.

FINANCIAL ASSISTANCE

The College of Nursing is actively seeking financial resources to assist students. State and governmental funds are available, and RNs can usually find local part-time work. The university also has limited funds available. Students who need financial aid should contact the graduate coordinator. University awards are in the form of internships and assistantships.

Internships. Internships are provided to students working with a particular professor at least ten hours a week. These students must be regular degree-seeking graduate students, registered during the time of the internship for at least 6 semester hours or 3 hours per term. They must have and maintain a 3.5 grade point average before and during the internship.

Assistantships. Teaching and research assistantships are available. Students must be registered and able to meet the skill and credit hour requirements for student assistant teachers and researchers. For more information, students should meet with the associate dean for research, development, and student affairs.

Scholarships. Scholarships, awarded on the basis of GPA and need, are available to degree-seeking master's students. Recipients must take at least 2 hours to maintain the scholarship. They must also maintain at least a 3.0 GPA. See Associate Dean of Student Affairs Mary Williams for more information.

RESOURCES AND OPPORTUNITIES

Research Center. The research center, available to faculty and graduate students, is equipped with computer stations and software supporting statistical quantitative data analyses and qualitative data management. The center has graphics capability and assists in the preparation of research reports, articles, and presentations.

Physiology Laboratory. The physiology laboratory is equipped to support physiological studies.

Study Facilities. Clinical agencies in urban and rural Utah are settings for advanced practice residencies. Many of these institutions maintain continual clinical research programs and innovative management strategies appropriate for graduate students. Nurse practitioner clinics and rural practitioner sites also offer a challenging experience in becoming an independent practitioner. A graduate study room is available on the fifth floor of the Spencer W. Kimball Tower.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

510R. Special Programs and Projects. (1–4)

Prerequisite: instructor's consent.

551. Health Assessment. (3)

Development of physical assessment techniques.

555. Pharmacology in Advanced Practice. (3)

Principles of pharmacology and drug therapy for nurse practitioners.

557. Health Promotion. (4)

Prerequisite: admission to graduate program.

Application of concepts, theories, and issues central to health promotion for individuals, families, and communities.

580. Nursing Information Systems. (3)

Prerequisite: admission to nursing major.

Use of computer technology in nursing research, client care, and education.

590R. Independent Study. (1–4)

Prerequisite: instructor's consent.

Individualized study.

600. Nursing Science 1. (2)

Critical examination of the development and use of knowledge and theory in advancing the science of nursing.

601. Nursing Science 2. (2)

Prerequisite: Nurs 600.

Critical examination of research methods used to develop and test theory and expand nursing knowledge.

602. Nursing Science 3. (1)

Prerequisite: concurrent registration in Nurs 600.

Development of writing skills through preparation of thesis or project proposal.

603. Nursing Issues and Health Policy. (2)

Exploration of issues facing nurses in advanced practice; role of nurses in identifying, formulating, legitimizing, and implementing health policy.

611. Health Planning and Evaluation (3)

Acquiring the language, strategies, and techniques of marketing, planning, and decision making in health care organizations.

612. Administrative-Management Theories. (3)

Analysis and evaluation of leadership, management, and organizational concepts and theories for effective nursing administration.

613. Finance in Nursing Management. (3)

Examination of public and private financing of the health care environment.

614. Administrative Residency. (3)

Prerequisite: Nurs 611, 612, 613.

Development of managerial skills in a nursing administration practicum.

620. Pathophysiology and Diagnostic Testing. (3)

Physiologic basis for therapy in complex clinical problems; development of laboratory testing skills.

622. Diagnosis and Management of Common Disorders. (6)

Prerequisite: Nurs 551; 554 and 555 or concurrent registration.

Diagnosis and management of common psychological, physiological, and pathophysiological alterations in health status.

625. Advanced Practice Seminar. (1)

Prerequisite: concurrent registration in Nurs 635 or 645.

Examination of the issues facing the nurse practitioner.

630. Diagnosis and Management of Chronic Family Health Problems. (5)

Prerequisite: Nurs 553, 620, 622.

Diagnosis and management of chronic psychosocial, physiological, and pathophysiological conditions in families.

632. Diagnosis and Management of Acute Family Health Problems. (4)

Prerequisite: Nurs 630.

Diagnosis and management of acute psychosocial, physiological, and pathophysiological conditions in families.

635. Advanced Practice as a Family Nurse Practitioner. (6-8)

Prerequisite: Nurs 632.

Internship as a family nurse practitioner.

698R. Project. (1-6)

Prerequisite: committee's consent.

Master's project.

699R. Master's Thesis. (1-6)

Prerequisite: committee's consent.

FACULTY

ANDERSON, VICKIE LANE, Associate Clinical Professor. MS, Brigham Young University, 1983. Nurse Practitioner.

BALDWIN, JOAN, Associate Professor. DNSc, Catholic University of America, 1992. Health Promotion in Nursing.

BECKSTRAND, RENE A, Assistant Clinical Professor. MS, Brigham Young University, 1987. Comprehensive Care of the Adult Client With Acute Health Problems.

CALLISTER, LYNN, Assistant Professor. PhD, University of Utah, 1993. Cultural Meanings of Childbirth; Women's Health.

CAMPBELL, LORA JEAN, Assistant Professor. MS, University of Utah, 1972. Pediatrics.

CONGER, CYNTHIA, Assistant Professor. PhD, University of Utah, 1994. Transcultural Nursing.

FOSBINDER, DONNA, Associate Professor. DNSc, University of San Diego, 1990. Nursing Administration; Patient Perceptions of Nursing Care.

LYONS, MARILYN, Associate Professor. DNSc, Rush University, 1983. Immunology; Alzheimer's Disease; Neurosurgery.

MANDLECO, BARBARA L., Associate Professor. PhD, Brigham Young University, 1991. Growth and Development; Resilience in Children.

MEASOM, GARY, Assistant Professor. PhD, University of New Mexico, 1992. Effects of Short Term Exercise Training Programs.

RECTOR, CHERIE, Assistant Professor. PhD, University of Southern California, 1994. Anxiety in School Age Children.

RIDDLE, LANA B., Associate Clinical Professor. PhD, Texas Woman's University, 1984. Capsular Contracture in Mammoplasty; Clinical Problems.

ROGERS, SANDRA, Associate Professor. DNSc, University of California, San Francisco, 1989. Primary Health Care; International Health.

SCHWARTZ, ROSANNE, Assistant Professor. PhD, University of Florida, 1991. Oxygenation in Neonates.

SORENSEN, ELAINE S., Associate Professor. PhD, University of Utah, 1987. Children and Stress; Family Adaption; Descriptive Methods.

WARNICK, MYRNA, Associate Professor. MSN, University of Utah, 1973. Nursing Management.

WILLIAMS, MARY, Associate Professor. PhD, University of Arizona, 1991. Transplant Anxiety; Management; Qualitative Methodology.

ORGANIZATIONAL BEHAVIOR

Program Director: W. Gibb Dyer, Jr.

790 TNRB
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(801) 378-2664

THE PROGRAM OF STUDIES

Organizational behavior is a relatively new professional field dedicated to creating compatibility between organizational goals and human values. Emphasizing the applied behavioral sciences, this two-year professional program is designed to prepare competent and ethical specialists. The master's degree program in organizational behavior is small, highly selective, and designed to meet the needs of individuals in two categories:

(1) those who wish to take a position in an organization working in the areas of human resource management, organization development, or strategy and (2) those who plan to pursue a doctoral degree in organizational behavior and then to enter university teaching, consulting, or equivalent positions in industry.

Each individual's program will be designed to meet that person's needs. Each student admitted will spend time doing organizational field research and have opportunities for teaching.

Since the program prepares individuals for professional careers, it is important that students be self-motivated, be able to accept individual responsibility, have a high tolerance for ambiguity, be able to design and implement action programs, and have a high degree of sensitivity to others.

One degree is offered through the Department of Organizational Behavior: Master of Organizational Behavior—MOB. Joint MOB/JD and MOB/International Development degrees are

also available contingent upon acceptance to both programs.

An average of twenty students are admitted to each year's class. This restriction encourages faculty/student interaction. Individuality and creativity are stressed, although emphasis is given to team learning experiences. The degree takes four semesters to complete.

Organizational Behavior—MOB

The program is designed to equip individuals with theoretical, analytical, diagnostic, and "change-agent" skills. These skills help graduates gather appropriate organizational information and make appropriate interventions. Human resource management skills involving employee selection, training, compensation and benefits, and personnel law are also a central part of the curriculum.

A strong emphasis is given to applied behavioral science areas such as decision making, leadership, motivation, organization design, management of conflict, organization-environment interface, planned change, and research. Course work is structured to give practical experience through special projects and research.

Admission and Entry.

- Semesters of entry and application deadlines: fall, March 1 (U.S. and international).
- Application requirements: minimum 3.0 GPA on a 4.0 scale for last 60 hours.
- Entrance examination: GMAT or GRE general test
- Prerequisite: baccalaureate degree in compatible field; interpersonal competence; interests and values consistent with a career in organizational behavior.

Requirements for Degree.

- Students in this program who do not have an undergraduate business degree will be required to take the management core. All MOB students will also take the following

required organizational behavior courses: OrgB 601, 602, 603, 604, 605, 606, 607, 680. By doing this, all students will fulfill AACSB requirements for a well-rounded business education, as well as develop in-depth expertise in organizational behavior.

The preceding does not represent the full range of requirements and opportunities in the program. Contact the department for greater details.

FINANCIAL ASSISTANCE

The Department of Organizational Behavior utilizes Marriott School of Management financial aid provisions. Qualified students can receive aid from the following: the MSM Scholarship Fund, private scholarship donations, assistantship awards, and loan assistance.

The MOB Program currently has two private scholarships:

- The Stephen G. and Louise R. Covey MOB Scholarship.
- The Culbert Laney Memorial Scholarship in Organizational Behavior.

RESOURCES AND OPPORTUNITIES

The N. Eldon Tanner Building. The Tanner Building, which houses the Marriott School of Management, is one of the finest facilities of its kind. Surrounding the dramatic eight-story atrium at its center are lecture and seminar rooms, study rooms, a computer laboratory, and a working library.

Much of the program's success results from the national prominence of the faculty. Each member represents expertise in distinct areas of organizational behavior and development. Faculty research interests currently include: human resource management; ethics; entrepreneurship; international management; diversity; labor relations; strategies in declining organizations; consulting; leadership; organizational culture; and industrial democracy.

COURSE DESCRIPTIONS

531. Managing Entrepreneurial Firms and Family Businesses. (3)

Issues and problems faced by managers of entrepreneurial enterprises and leaders of family-owned businesses.

551. Theory and Practice of Third-World Development. (3)

Paradigms of economic development; strategies and applications in various societies.

561. Labor Relations. (3)

Overview of the U.S. system of industrial relations and collective bargaining; evolution of unionism and labor-management relations, labor law, union-organizing campaigns, contract negotiation, and arbitration procedures.

601. Organizational Paradigms. (3)

Introduction to historical development and application of alternative organizational paradigms. Implications of these paradigms for understanding and influencing organizational behavior.

602. Organization Theory. (3)

Theoretical foundations for organizational diagnosis, particularly emphasizing building diagnostic models and frameworks.

603. Research Design and Data Analysis. (3)

Philosophy of science as it relates to research methodology; both qualitative and quantitative methods of data gathering and analysis.

604. Dynamics of Organizational Change: Interventions and Strategies. (3)

Forces operating to induce or resist change in organizations; current models and methods for organizational intervention and the intervention process.

605. Human Resource Management. (3)

Analysis of human resource functions, including HR planning, staffing, interviewing, selection, performance evaluation, training and development, compensation and benefits, labor relations, and labor laws.

606. Dynamics of Groups and Work Teams. (3)

Group dynamics and process in organizations. Theory and skill development applied to both individual roles in groups and effective work teams.

607. Strategic Management: Issues and Perspectives. (3)

Several approaches to strategic thinking to gain appreciation for strengths and weaknesses; insights applied to current strategic issues.

610. Management Philosophy and Style. (3)

Contemporary models of management and developing a philosophy of management.

614. Organizational Communication. (3)

Theory and research of organizational communication as the basis for understanding human resource development.

616. Industrial Democracy. (3)

Contemporary efforts to restructure the workplace, including co-determination, self-management, cooperatives, and other quality-of-work-life schemes, especially in the U.S. and Europe.

630. Dynamics of Interpersonal Behavior. (3)

Application of skills in problem diagnosis, empathy, and communications in group and interpersonal settings.

636. Diversity and Discrimination in Organizations. (3)

Dynamics of difference and discrimination in organizations, considered from three perspectives: interpersonal, intergroup, and institutional. This course provides a model that has helped managers analyze discrimination and work more effectively with different employee populations.

645. Managing Organization Cultures. (3)

Insights and skills used to diagnose relationships between organizational mission and organizational culture. Examination of patterned customs and meanings of a particular group, such as taken-for-granted assumptions, values, and conceptual frameworks. Primarily oriented toward getting students into organizations where they can apply and improve their skills and insights.

657. Design, Media, and Computers in Human Resource Development. (3)

Production and use of audio, visual, and video materials for training and human resource development.

660R (OrgB-MBA 647). Advanced Seminar in Organizational Behavior. (1-3)

Special topics or problems varying from semester to semester, e.g., conflict resolution, power and influence, intergroup relations, career development and planning, and management skills.

669R. Readings in Organizational Behavior. (1-6)

Reading and discussion course with direction from a faculty member in areas of the student's interest.

672. The Consultative Process. (3)

Examination of role in group development, educational processes, conflict resolution, and organizational interventions and strategies. Evaluations of the ethical and skill requirements of the consultative role.

679R. Practicum in Organizational Development. (1-6)

Completion and analysis of an organizational development project under supervision of a faculty member and a recognized professional person in an organization.

680. Organizational Behavior**Research Report. (3)**

Writing and defending a report about the student's work experience in an organization.

FACULTY

CHERRINGTON, DAVID J., *Professor.* PhD,

DBA, Indiana University, Bloomington, 1970. Personnel Management; Organizational Behavior and Ethics.

DYER, W. GIBB, JR., *Professor.* PhD, Massachusetts Institute of Technology, 1984. Organizational Culture; Entrepreneurship; Management of Family-Owned Firms.

GREGENSEN, HAL B., *Associate Professor.* PhD, University of California, Irvine, 1989. Organizational Change; International Management; Cross-Cultural Management.

GODFREY, PAUL C., *Assistant Professor.* PhD, University of Washington, 1994. Business Strategy; Organizational Theory; Management Philosophy.

KIRKHAM, KATE L., *Associate Professor.* PhD, Union Graduate School, 1977. Organizational Development; Diversity.

MEEK, CHRISTOPHER B., *Associate Professor.* PhD, Cornell University, 1983. International Development; Cross-Cultural Analysis in Organizational Behavior; Labor-Management Cooperation.

MILLS, GORDON E., *Professor.* PhD, Pennsylvania State University, 1970. Human Resources Diagnosis and Analysis; Media Development and Presentation.

PERRY, LEE T., *Professor.* PhD, Yale University, 1982. Strategies in Declining Organizations; Behavioral Implications of Mergers and Acquisitions; Radical Product Innovation.

PETERSON, BRENT D., *Professor.* PhD, Ohio University, 1970. Human Resources; Consulting.

RITCHIE, J. BONNER, *Professor.* PhD, University of California, Berkeley, 1968. Organizational Philosophy and Theory.

STEPHAN, ERIC G., *Professor.* PhD, University of Utah, 1966. Management; Leadership; Organization Revitalization.

WHETTEN, DAVID A., *Professor.* PhD, Cornell University, 1974. Organizational Theory; Management Skills; Organizational Identity.

WILKINS, ALAN L., *Professor.* PhD, Stanford University, 1979. Organizational Culture and Control.

WOODWORTH, WARNER P., *Professor.* PhD, University of Michigan, 1974. Industrial Democracy; Worker Ownership; International Development.

PHILOSOPHY

Chair: K. Codell Carter

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(801) 378-2721

THE PROGRAM OF STUDIES

The study of philosophy cultivates critical and analytical skills and is, therefore, an excellent complement to any graduate program. Specific requirements of the minor can be adapted to the needs and interest of the student.

The Department of Philosophy offers a graduate minor but not a graduate major.

Philosophy—Minor

Philosophy students study significant texts and analyze issues in diverse disciplines. In doing so, they gain basic habits of mind needed for mature and responsible judgment.

Requirements for Degree.

- Master's level: an approved 9 hours.
- Doctoral level: an approved 15 hours.

Students should direct inquiries about courses and graduate committee members to the department chair.

COURSE DESCRIPTION**501R. Graduate Seminar. (2-5)**

Prerequisite: instructor's consent.

Selected topic, figure, or movement in philosophy, as announced in current class schedule.

FACULTY

For faculty listings, refer to the BYU Undergraduate Catalog.

PHYSICAL EDUCATION

Chair: Earlene Durrant
Graduate Coordinator: A. Garth Fisher

116 RB
 PO Box 22116
 Provo, UT 84602-2116
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THE PROGRAM OF STUDIES

The mission of the Department of Physical Education encompasses the larger university mission in that we also wish to assist individuals in their quest for perfection and eternal life, emphasizing the truth that "the human body is sacred, the veritable tabernacle of the divine spirit." Our supporting mission is to (1) understand and advance the body of knowledge unique to physical education, (2) prepare physical educators to go forth in society to serve in the broad fields of the discipline in ways that foster dignity and respect for the human body, and (3) provide experiences that will stimulate the acquisition and enjoyment of sport and fitness skills that can be used throughout life to foster health and happiness.

The Department of Physical Education has the following graduate program objectives:

- To provide a scholarly approach to physical education through careful research and rigorous intellectual inquiry.
- To develop and train qualified professionals in physical education.
- To develop scholars in physical education who can extend the body of knowledge.

The following degrees are offered through the Department of Physical Education: Physical Education—MS; Physical Education—MEd; Physical Education Administration, Curriculum, and Instruction—EdD; and Exercise Science/Wellness—PhD.

About twenty-five students are admitted into the graduate programs each year, comprising approximately eleven in the MS program and six in the MEd program, with the remainder pursuing doctorate degrees. Most students complete the MS degree in two years, the MEd degree in two years, the EdD degree in three years, and the PhD degree in three and a half years.

Physical Education—MS

Candidates who have a scholarly interest in the scientific or historical aspects of physical education are encouraged to pursue this degree.

Areas of specialization: Physical Education, Health Promotion, Exercise Physiology, Athletic Training.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Achieve satisfactory score on GRE (recommended minimum 1380).
- GPA: minimum 3.0 for last 60 hours of undergraduate work.
- Submit a statement of intent that includes the following information about the applicant: (1) preparation and background for the program, (2) desired emphasis, (3) basic reasons for career choice, (4) special qualities and talents that would enhance success, (5) professional goals, (6) particular reasons for applying to BYU, (7) specific duration for accomplishing graduate degree, and (8) any specific circumstances or objectives to be considered (optional).
- Prerequisite: see prerequisites with each specialization.

Requirements for Degree.

- Credit hours: minimum 30–31, with 24–25 being course work hours, plus 6 thesis hours (PE 699R) within the following areas of specialization.
- Areas of specialization: the four areas have the following in common:
 —Prerequisite: a baccalaureate degree in physical education or a baccalaureate degree in a related

field and completion of PE 350, 361, 362, 363, 367, or equivalents.

—Core courses (12 hours): PE 630, 631, 691, 699R (thesis, 6 hours).

Physical Education

—Required courses (11–12 hours): PE 654 or 655; 656 or 657; 659, 662, 666.

—Electives (7 hours): select one of the following three sets of courses and one additional graduate course in physical education or a related field: (a) pedagogy: PE 649, 658; (b) administration: PE 651, 652; or (c) exercise science: PE 663, 667, 669;

Health Promotion

—Prerequisite: in addition to above prerequisite, the following undergraduate courses (or equivalent) must be completed before commencing the MS degree: PE 451, 468.
 —Required courses (18–19 hours): PE 599R (4 hours); 661, 666, 667, 669; Hlth 665; PMgt 640 or OrgB 605.

Exercise Physiology

—Prerequisite: in addition to above prerequisite, the following undergraduate courses (or equivalent) must be completed before commencing the MS degree: college physics; Math 110; Chem 481; Zool 460; PE 468, 469.
 —Required courses (12 hours): PE 666, 667, 669; Zool 565.
 —Electives: select 6 hours from Chem 584; Zool 526, 566, 589R (CV); PE 659, 662, 663, 693R (1 hour), 766, 769.

Athletic Training

—Prerequisite: in addition to the core courses, the following must be completed: PE 320, 321, 350, 361, 362, 363, 367, 425, 426, plus NATA certification. If the student is *not* NATA certified, then the MS degree with specialization in athletic training and NATA certification can be earned by completing the preceding prerequisite plus PE 620 and 5 additional hours of PE 629R (6 hours total), in addition to the following courses:
 —Required courses (19 hours): PE 560; 620; 621; 622; 629R (1 hour);

662, 663, or 668; 666; 667; 693R (2 hours).

- Minor: none required.
- Thesis.
- Examination: oral defense of thesis.

Physical Education—MEd

The MEd degree is designed specifically for teachers and coaches who do not wish to engage in a research study as part of the master's degree program. The MEd degree program is generally considered to be a terminal degree. A student completing this degree who wishes to pursue a doctorate will be required to write a thesis before writing a dissertation.

Admission and Entry.

- Application deadlines: see MS.
- Application requirements: see MS.
- GPA: see MS.
- Statement of intent: see MS.
- Prerequisite: baccalaureate degree in physical education or a related field and completion of the following courses or equivalents: PE 350, 361, 362, 363, 367. Demonstrated competence in writing, fitness, sport and/or dance skills, and computer use.

Requirements for Degree.

- Credit hours: minimum 36.
- Required courses: PE 468, 630, 631, 649, 650, 651, 652, 654, 655, 656, 657, 658, 659, 662, 691.
- Electives: 1–3 hours.
- Minor: none required.
- Examination: comprehensive examination.

Physical Education Administration, Curriculum, and Instruction—EdD

The EdD program in administration, curriculum, and instruction in physical education is a three-year program designed to prepare graduates for positions as administrators, program directors, or consultants at the elementary, secondary, or college levels.

Admission and Entry.

- Application deadlines: see MS.

- Application requirements: see MS.
- GPA: minimum 3.5 for last 60 hours of course work.
- Statement of intent: see MS.
- Prerequisite: master's degree in physical education or equivalent; demonstrated competence in writing, speaking, fitness, sport and/or dance skills, and computer use; and two years of successful professional experience. PE 797R is a prerequisite for candidates who have not written a thesis. These candidates must produce a publishable research manuscript before beginning work on a dissertation. (This is prerequisite to the dissertation and will not count toward the 68 hours.)

Requirements for Degree.

- Credit hours: minimum 68 hours beyond baccalaureate degree (at least 37 of which must be at BYU), including 12 dissertation hours (799R).
- Skill requirement: Stat 501, 502, computer literacy, and prerequisites for supporting areas.
- Required core courses: PE 630, 654, 655, 656, 657, 659, 662, 691.
- Required courses: PE 649, 650, 651, 652, 658, 751R, 755; EPsy 601 or 620; 12 hours of supporting course work outside the Department of Physical Education. A majority of the work must be taken at BYU.
- Minor (optional): organizational behavior or instructional science.
- Dissertation.
- Examinations: (A) comprehensive examination; (B) oral defense of dissertation.

Exercise Science/Wellness—PhD

The PhD in exercise science/wellness is designed to prepare students for leadership at the highest level of their profession. Since most of the students who receive PhDs will become university or college faculty and will teach and publish in their chosen area, students must be (1) well trained in the scientific basis of exercise science/wellness, (2) well acquainted with the scientific literature, and (3) able to do independent research.

Admission and Entry.

- Application deadlines: see MS.
- Achieve satisfactory score on GRE (recommended minimum 1530).
- GPA: minimum 3.5 for last 60 hours.
- Statement of intent: see MS.
- Be accepted by a specific graduate faculty member who will act as mentor.
- Prerequisite:
Baccalaureate degree in physical education or related field, with competence equivalent to the following: historical, philosophical, and sociological foundations of physical education (PE 350), measurement and evaluation (PE 360), motor learning (PE 361), kinesiology and biomechanics (PE 362), physiology of activity (PE 363), health promotion (PE 451), and problems in conditioning (PE 468). *PE 797R for candidates who have not written a thesis.* These candidates must produce a publishable research manuscript before beginning work on a dissertation. (This is prerequisite and will not count toward the 60 hours.)
—Foundational science competencies: anatomy and physiology (Zool 260, 261), college chemistry (Chem 105, 106, 107), college mathematics (Math 110).
- It is recommended that applicants have at least one degree (BS, MS) from a university other than BYU.

Requirements for Degree.

- Credit hours: minimum 60 hours beyond the bachelor's degree (includes dissertation) in addition to skill requirement and supporting area prerequisites. Students who have earned a master's degree must complete at least 36 hours of additional graduate work.
- Skill requirements: all students in this program need Stat 501 and 502 or comparable courses. Prerequisites for the various supporting areas are also considered skills.
- Core requirements: PE 630, 661, 666, 667, 669, 671, 673, 751R, 797R, 799R.
- Supporting areas: minimum 9 hours of graduate credit, with prerequisites, must be included in two related areas, or 18 hours in one approved related area: nutrition,

exercise physiology/zoology, exercise epidemiology, biomechanics, therapeutic exercise, or motor learning. Other areas may be approved by the student's committee.

- PhD students must register for at least two consecutive 6-hour semesters on the BYU Provo campus.
- Dissertation.
- Examinations: (A) comprehensive examination; (B) oral defense of dissertation.

FINANCIAL ASSISTANCE

Financial assistance is available in the form of graduate teaching assistantships. The graduate student will teach physical education activity or required laboratory classes.

RESOURCES AND OPPORTUNITIES

The Department of Physical Education utilizes the Human Performance Research Center. The primary purpose of the center is to support applied and basic research programs of faculty and graduate students on such topics as nutrition and exercise, drugs and exercise, exercise and cardiovascular disease, exercise and weight control, and other contemporary issues in exercise science.

Other resources exist in these areas:

Anatomy: five cadavers and skeletons.
Biomechanics: three-dimensional video analysis, force plate analysis, and electromyographic analysis equipment.

Exercise Biochemistry: biochemical analysis, and muscle biopsy equipment.

Human Performance: treadmills, bicycle ergometers, hydrostatic weighing facility, and EKG units.

Small Animal Facility: 200 animal cages and tissue traumatizer.

Athletic Training: one large well-equipped facility plus two satellite training rooms located in the Marriott Center and football stadium.

Motor Learning: devices for measuring learning, speed of movement, and reaction time.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

550. Motor Development and Growth of Children. (2)

Existing body of knowledge regarding motor development of children and significance of physical activity in early childhood.

560. Orthopaedic Pathomechanics. (2)

Prerequisite: PE 460 or equivalent.

Advanced analysis of neuromusculoskeletal deformities, and/or injury. Therapeutic exercise and the use of orthoses.

582. Physical Education for the Mentally Retarded. (2)

Prerequisite: baccalaureate degree in physical education.

Theoretical and practical aspects of teaching the mentally retarded child and adult.

586R. Workshop in Fitness and Sport. (1-4)

Prerequisite: undergraduate major in physical education or equivalent.

599R. Practicum. (1-9)

Prerequisite: PE 468 or concurrent registration for conditioning coaches.

Field experience for physical education students; fifty hours of volunteer service in approved organization required per credit hour.

620. Advanced Athletic Training. (3)

Prerequisite: PE 320, 420.

Advanced theory and practical skills in prevention, immediate care, and treatment of injuries.

621. Physical Examination and Rehabilitation of Athletic Injuries. (2)

Prerequisite: PE 320, 363, 420, 460, 560, 620.

For athletic training students. Specific rehabilitation programs for specific injuries; examining the injury.

622. Therapeutic Modalities in the Treatment of Athletic Injuries. (2)

Prerequisite: PE 320, 363, 420, 620.

For athletic training students. Hydrotherapy, massage, traction, radiant energy, heat, cold, and electrotherapy.

629R. Athletic Training

Practicum. (1-6)

Prerequisite: PE 320, 420, 620, and advisor's consent.

Academic and practical application of athletic training skills in the training room setting.

630. Research Methods in Physical Education. (3)

Prerequisite: PE 360 or equivalent.

Understanding, designing, and conducting research; writing for publication in physical education.

631. Research Design in Physical Education. (2)

Prerequisite: PE 360 or equivalent; PE 630.

Designing, conducting, and analyzing data for experimental and survey research studies in physical education using standard statistical procedures.

649. Curriculum Theory and Design in Physical Education. (3)

Theoretical and practical aspects of curriculum design in physical education.

650. Measurement and Evaluation in Physical Education. (2)

Prerequisite: PE 631 or Stat 501, or concurrent registration.

Instruments and procedures for psychomotor, fitness, cognitive, and affective assessment in physical education.

651. Personnel Management and Supervision in Physical Education. (3)

Theory and practice of successful personnel management and supervision in physical education.

652. Administration of Physical Education and Athletic Programs. (3)

Administration and management of physical education, athletics, and related programs and the role of public relations in these programs.

654. History of Physical Education. (3)

Review and analysis of historical facts and events in physical education and sports.

655. Philosophy: Ethics and Issues. (2)

Ethical and moral interpretations and concepts underlying the profession.

656. Psychological Implications of Sport. (2)

Prerequisite: graduate standing; Psych 111, PE 450, or equivalent.

Psychological phenomena inherent in sport as they relate to the teacher/coach, participant, and spectator.

657. Sport and Society. (2)

Prerequisite: PE 450 or equivalent.

Relationship of sport to other elements of society, emphasizing the twentieth century.

658. Learning Theory, Sport Pedagogy, and Instructional Design in Physical Education. (3)

Prerequisite: PE 659.

Systematic approach to designing and evaluating cognitive, psychomotor, and affective instruction in physical education.

659. Theory of Motor Learning. (2)

Prerequisite: PE 361.

Theories and methods of learning physical skills.

661. Fitness and Wellness in the Workplace. (3)

Prerequisite: PE 451 or equivalent.

Management for effectively designing, marketing, implementing, and administering health promotion programs.

662. Mechanical Analysis of Activities. (2)

Prerequisite: PE 362 or equivalent.

Analysis of human movement and sport activities using kinematic and kinetic descriptions and models of motion based on three-dimensional video and force plate techniques.

663. Research Techniques in Biomechanics of Sport. (2)

Prerequisite: PE 362, 662.

Theory and practice of research techniques in biomechanics: statics, dynamics, body segment parameters, photo instrumentation, electronic instrumentation, digital computer techniques, literature sources, and laboratory fundamentals.

666. Exercise Physiology. (3)

Prerequisite: PE 363.

Adjustments made by the body to accommodate physical activity.

667. Laboratory Methods and Procedures. (2)

Prerequisite: PE 363; 666 or concurrent registration.

Basic techniques and procedures used in human performance laboratories.

668. Pathomechanical Human Anatomy. (3)

Prerequisite: Zool 260, 469, or equivalent.

Regional anatomy, emphasizing role of anatomy in etiology, recognition, evaluation, and rehabilitation of athletic injuries and orthopaedic impairments. Students dissect cadavers.

669. Exercise, Testing, and Prescription in Coronary Heart Disease. (2)

Coronary heart disease: risk factors, symptoms, and interventions; role of exercise in testing, prescription, and rehabilitation.

671. Health Risk Management. (3)

Prerequisite: PE 661, 666, 667.

Management of health risks, particularly those relating to cardiovascular disease, cancer, and obesity.

673. Obesity and Weight Management. (3)

Etiology, treatment, and prevention of obesity in various populations, emphasizing the role of exercise in weight control programs.

685. Physical Education in the Elementary School. (2)

For teachers, administrators, and supervisors. Curricular interrelationships and content materials directed toward obtaining educational results.

691. Seminar. (1)

Prerequisite: acceptance into graduate program.

Orientation of students to physical education. Evaluation of students' aptitudes, leadership qualities, and ability to successfully complete a graduate program.

693R. Graduate Seminar in Readings. (1)

Prerequisite: PE 666 or concurrent registration for exercise physiology section.

Weekly seminar covering selected topics in physical education. Doctoral students in exercise physiology should enroll each semester.

699R. Master's Thesis. (1-9)**751R. Doctoral Seminar. (2)**

Prerequisite: registration in EdD or PhD program. EdD students must enroll for four consecutive semesters.

Topics rotate each semester: teaching physical education or athletic training in higher education; research and publication; program coordination, advisement, and supervision; grantsmanship. For university professors, administrators, and consultants.

755. Research on Teaching and Teacher Evaluation in Physical Education. (2)

Prerequisite: PE 659.

Review of research on teaching and teacher evaluation affecting teaching and administration of physical education.

766. Advanced Exercise Physiology: Cardiopulmonary. (3)

Prerequisite: PE 666, 667.

Cardiovascular and pulmonary systems and how they meet the metabolic needs of muscles during exercise.

769. Advanced Exercise Physiology: Skeletal Muscle. (3)

Prerequisite: PE 666, Chem 481.

Effects of acute and chronic exercise on anatomy, physiology, and biochemistry of skeletal muscle.

797R. Individual Research and Study in Physical Education. (2-9)

Prerequisite: undergraduate major in physical education; matriculation for graduate study in the department.

799R. Doctoral Dissertation. (1-18)

FACULTY

ALDANA, STEVE, *Assistant Professor*. PhD, Arizona State University, 1991. Exercise Science; Wellness.

ALLSEN, PHILIP EDMOND, *Professor*. EdD, University of Utah, 1965. Exercise Physiology; Physical Fitness.

BARKER, RUEL M., *Associate Professor*. EdD, Brigham Young University, 1971. Elementary Physical Education; History of Physical Education.

BLAKEMORE, CONNIE L., *Associate Professor*. EdD, Temple University, 1984. Sport Pedagogy.

CHAMBERLAIN, DIANE, *Assistant Professor*. EdD, University of Utah, 1984. Sociology of Sport; Elementary Physical Education.

CLARKE, MARK S., *Associate Professor*. EdD, Brigham Young University, 1971. Elementary Physical Education; Motor Development.

CONLEE, ROBERT K., *Professor*. PhD, University of Iowa, 1975. Exercise Physiology.

DRAPER, DAVID O., *Associate Professor*. EdD, Northern Illinois University, 1988. Athletic Training.

DURRANT, EARLENE, *Professor*. EdD, Brigham Young University, 1975. Athletic Training.

FISHER, A. GARTH, *Professor*. PhD, University of New Mexico, 1969. Exercise Physiology.

GEORGE, JAMES D., *Assistant Professor*. PhD, Arizona State University, 1995. Exercise and Wellness.

HALL, LARRY THOMAS, *Associate Professor*. PhD, University of Utah, 1976. Motor Learning.

HARRISON, JOYCE M., *Professor*. EdD, Brigham Young University, 1973. Curriculum and Instructional Design.

HAWKES, NENA, *Assistant Professor*. PhD, Union Institute, 1993. History; Sport Pedagogy.

LEISHMAN, COURTNEY M., *Associate Professor*. EdD, Brigham Young University, 1976. Athletic Administration.

LEWIS, KATHRYN, *Associate Professor*. EdD, Brigham Young University, 1978. Kinesiology; Biomechanics.

LOCKHART, BARBARA D., *Professor*. EdD, Brigham Young University, 1971. Administration; Ethics and Philosophy.

MCGOWN, CARL M., *Professor*. PhD, University of Oregon, 1971. Motor Learning.

MYRER, WILLIAM, *Associate Professor*. PhD, Brigham Young University, 1983. Correctives and Rehabilitation.

RICARD, MARK, *Associate Professor*. PhD, Southern Illinois University, 1986. Kinesology; Biomechanics.

SCHULTHIES, SHANE S., *Assistant Professor*. PhD, Brigham Young University, 1991. Correctives and Rehabilitation.

SILVESTER, L. JAY, *Associate Professor*. EdD, Brigham Young University, 1976. Physical Fitness; Health Promotion.

TUCKER, LARRY A., *Professor*. PhD, Southern Illinois University, 1981. Health Promotion; Research Methods.

WILKINSON, CAROL, *Assistant Professor*. EdD, Brigham Young University, 1983. Pedagogy.

ZANANDREA, MARIA, *Assistant Professor*. EdD, Brigham Young University, 1992. Physical Education for Special Populations.

PHYSICS AND ASTRONOMY

Chair: Dorian M. Hatch

Graduate Coordinator: Jean-François S. Van Huele

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THE PROGRAM OF STUDIES

The Department of Physics and Astronomy is committed to excellence in scholarship. It is actively engaged in scholarly research, contributing to the worldwide development of its scientific disciplines. It integrates those activities into the graduate programs, allowing its graduate students to experience first-hand the excitement of discovering new knowledge.

Three degrees are offered through the Department of Physics and Astronomy: Physics—MS, Physics—PhD, and Physics and Astronomy—PhD.

The average number of MS and PhD students in the department is sixteen and twenty-five, respectively. The average time to complete a degree is two years for the MS and six years for the PhD.

Physics—MS

The master of science degree is sometimes sought by those who intend to continue on for the PhD, but more often it serves as a terminal degree for those who intend to work in industrial or governmental research or teaching.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Entrance examination: GRE advanced physics subject test.
- Prerequisite: baccalaureate degree in physics or equivalent. Appropriate course work will be suggested

by graduate advisor for removing deficiencies in undergraduate study.

Requirements for Degree.

- Credit hours (30): minimum 24 approved course work hours including 18 hours of nonrepeatable graduate courses (a repeatable course is one whose number ends in R), plus 6 thesis hours (Phscs 699R).
- Required course: Phscs 591R each semester of residence; Phscs 597R first two semesters of residence.
- Thesis.
- Examinations: final oral examination and defense of thesis.

Before admission to candidacy, a student must be accepted as a research student by a member of the faculty of the Department of Physics and Astronomy and submit a proposed study list. The study list is normally completed by the beginning of the second semester of graduate study.

Physics, Physics and Astronomy—PhD

The PhD program prepares students for professional careers in physics and astronomy. These careers include faculty positions at universities and work in research laboratories. Most students who intend to receive the PhD do not enter the MS program.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Entrance examination: GRE advanced physics subject test.

Requirements for Degree.

- Credit hours (66): minimum 48 hours in approved course work (B-grade or better in each class) exclusive of graduate seminars (see Phscs 591R); plus dissertation (18 hours minimum, Phscs 799R).
- Required core courses: Phscs 591R each semester of residence; Phscs 597R first two semesters of residence.
Physics Degree: Phscs 517, 518, 621, 641, 642, 651, 652.

Physics and Astronomy Degree: Phscs 517, 518, 527, 528, 621, 651, 652.

- Required courses in emphasis: at least 12 hours in the specialty listed below that is most closely related to the field of research to constitute a major and 12 hours in a second specialty to constitute a minor. No duplication between the courses listed below and those listed above is permitted. Students whose research is in acoustics may, with the approval of their committee, construct a 12-hour minor that includes courses outside the department.

Acoustics: Phscs 561, 562, 565, 566, 581, 623, 631, 681.

Astrophysics: Phscs 527, 528, 529, 611, 612, 627, 628, 711R.

Atomic Physics: Phscs 527, 528, 571, 631, 632, 671, 711R.

Nuclear Physics: Phscs 631, 655, 656, 711R, 751, 752.

Plasma Physics: Phscs 536, 537, 545, 546, 623, 631, 632, 645, 646, 711R.

Solid-State Physics: Phscs 623, 631, 632, 681, 682, 711R.

Theoretical Physics: Phscs 617, 618, 619, 625, 626, 632, 711R, 751, 752.

Physics Group for Physics and

Astronomy Degree Only: 6 hours from Phscs 536, 537, 625, 626, 645, 646, 655, 656, 711R; 6 hours from 631, 632, 641, 642.

- Foreign language/Skill requirement: select any one of the following four options:
Option 1—Single Language: demonstrate a thorough familiarity with French, German, or Russian. An examination will test ability to (1) translate literature in the student's field and (2) communicate orally in the language. In lieu of a special examination, the student can meet this requirement by completing a minimum 22 semester hours in the language chosen with a 3.0 or higher GPA. In either case, the language department involved must certify competency.
Option 2—Two Languages: complete one of the following requirements for each language (acceptable languages are French, German, and Russian): take and pass approved intensive reading courses in the language; complete 16 semester hours

of credit with an average grade of B (3) in the language.

Option 3: demonstrate competency in reading Russian, French, or German. Demonstrate competency in the use of computers as they relate to scientific computations comparable to the completion of a 3-hour computer science course. Complete satisfactorily 6 hours of course work, approved by the graduate committee and selected from (a) upper-division or graduate mathematics courses (except Math 343, 344, 434); (b) upper-division or graduate statistics or computer science courses emphasizing the use of statistics and computers in the physical sciences; (c) Phscs 617, 618.

Option 4: demonstrate competency in the use of computers as they relate to scientific computations comparable to the completion of a 3-hour computer science course. Complete satisfactorily 6 hours of course work, approved by the graduate committee and selected from (a) upper-division or graduate mathematics courses (except Math 343, 344, 434); (b) upper-division or graduate statistics or computer science courses emphasizing the use of statistics and computers in the physical sciences; (c) Phscs 617, 618. Complete satisfactorily 9 more hours of course work, approved by the graduate committee and selected from the list in Option 3.

- Dissertation.
- Examinations: (A) comprehensive written and oral examinations when next given after completion of required courses (these are regularly scheduled early in September); (B) oral examination and defense of dissertation.

Before admission to candidacy, a student must be accepted as a research student by a member of the faculty of the Department of Physics and Astronomy and submit a proposed study list. The study list is to be completed by the beginning of the second semester of graduate study.

FINANCIAL ASSISTANCE

Qualified graduate students receive financial aid that may take the form of one or more of the following: teaching assistantships, research assistantships, scholarships (including the John Einar Anderson Scholarship), internships, university-sponsored fellowships, or tuition awards. The amount of financial aid given depends on individual merit.

RESOURCES AND OPPORTUNITIES

Within the department there are currently seven recognized research specialties: Acoustics; Astrophysics; Atomic Physics; Nuclear Physics; Plasma Physics; Condensed Matter Physics; Theoretical Physics.

X-Ray Imagery and Laser Physics Group. At present heavily involved in the development of advanced X-ray imaging and X-ray spectroscopy, the laser program is an interdisciplinary effort involving physics, chemistry, and electrical engineering. The award from the state will help finance expanded research into producing optical devices to manipulate soft X-rays. With such devices, X-rays might be used to see the structure of living cells, to make smaller and faster computers, and to improve defense against ballistic missiles.

Acoustics. The acoustics research program is strongly cross-disciplinary in character and focuses on the following areas: music, speech, architecture, and noise. Most of the research in acoustics involves simulation of physical systems and signal processing of music and speech. Ready access is possible to a MicroVAX network, including a NeXT computer equipped with hardware and software for data acquisition and manipulation.

Astrophysics and Astronomy. Most research in astrophysics and astronomy is observational. Much of it conducted with the BYU twenty-four-inch telescope at West Mountain Observatory, twenty miles southwest of campus, which, at 6,800 feet elevation,

is a relatively dark, haze-free site. There is also frequent use of observatories in Arizona, California, and Chile. Topics of current or recent research include the evolutionary status of variable stars, especially classical and dwarf Cepheids; the reliability of secondary photometric standards; population II stars; interstellar reddening; the development status of both old and young galactic star clusters; globular star clusters; the galaxian luminosity function; and the photometry of rich galaxy clusters and of galaxies in or near cosmic voids.

Plasma Physics. Plasma physics research, both experimental and theoretical, centers on the relatively new area of nonneutral plasmas. New experimental techniques are being developed to measure the distribution function of these plasmas in both configuration and velocity space. The response of the plasma to both static and time-dependent perturbations is being studied. The theoretical work being done attempts to extend the mathematical description of these plasmas beyond the simple approximate geometries and fluid models that have been used in the past.

Condensed Matter Physics. A large variety of topics is being investigated. Efforts are centered on studies of phase transitions in crystalline solids. Interest is in phase diagrams, symmetry changes at the transition, critical phenomena, etc. A number of experimental techniques are applied: dielectric measurements, electrical resistivity measurements, electron spin resonance (EPR) and nuclear magnetic resonance. An emphasis is made on the symmetry change at a phase transition. Computer algorithms have been written to systematically answer many of the questions for a given symmetry change. Theoretical studies are also underway on the interaction of nuclear electromagnetic movements in solids with electromagnetic fields in the material. Realistic models have been calculated of dynamic effects on hyperfine interactions of rapidly moving vacancies.

Theoretical Physics. There is work in the following areas: modeling of the electrostatic and the electromagnetic radiation field of molecules; methods of Bayesian statistics for a more careful and accurate physical interpretation of the information acquired from a sequence of quantum measurements; formulation of quantum electrodynamics (QED) without divergences; solutions of coupled equations for the electron and photon propagators in the nonperturbative regime of QED; relativistic electron theory; differential forms, Backlund transformations, and symmetry groups to search for methods of finding exact solutions for certain partial differential equations of mathematical physics; molecular dynamics of defects and impurities in clusters and solids; algebraic methods applied to energy transfer in molecular systems.

Nuclear Physics. The research in nuclear physics is centered around two positive-ion Van de Graff accelerators rated two and four million volts; high resolution, computer-based systems for detection and analysis of X-rays and gamma rays; and several specialized neutron detectors and spectrometers. A research emphasis within this program involves application of particle beams produced by accelerators to probe the structure of materials. The methods used are particle-induced X-ray emission (PIXIE), extended X-ray absorption fine structure spectrometry (EXAFS) and Rutherford backscattering (RBS).

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

513R. Special Topics in Contemporary Physics. (1-3)
Prerequisite: instructor's consent.

Topics generally related to recent developments in physics.

517, 518. Mathematical Physics. (3 ea.)
Prerequisite: Phscs 318, Math 434.

Topics in modern theoretical physics, including applications of matrix and tensor analysis and linear differential and integral operators.

527, 528. Introduction to Astrophysics. (3 ea.)

Prerequisite: instructor's consent.

Principles and observational techniques of astrophysics.

529. Observational Astrophysics. (3)

Prerequisite: Phscs 527, 528.

Survey of important areas of current research.

536, 537. Space and Planetary Physics. (3 ea.)

Prerequisite: Phscs 321, 431, 442.

Solar plasmas, planetary atmospheres and interiors, comets, cosmic rays, and space measurement techniques.

545. Introduction to Plasma Physics. (3)

Prerequisite: Phscs 321, 431, 441.

Introduction to plasma physics, including single-particle motion and both fluid and kinetic models of plasma behavior.

546. Plasma Transport. (3)

Prerequisite: Phscs 545.

Transport processes in plasmas applied to space physics, fusion, and laser plasmas.

551. Quantum Mechanics. (3)

Prerequisite: Phscs 222, 318, or equivalent.

Analytical foundations of quantum mechanics.

552. Modern Physics. (3)

Prerequisite: Phscs 551.

Applications of quantum mechanics and special relativity to atomic, molecular, statistical, condensed matter, and nuclear physics; elementary particles.

561. Fundamentals of Acoustics. (3)

Generation, transmission, and reception of sound. Vibrating systems, properties of elastic media, mechanical and electrical energy, and radiation.

562. Acoustical Measurements. (1-3)

Prerequisite: Phscs 561 or concurrent registration.

Selected experiments in acoustics.

565. Acoustics of Music and Speech. (3)

Prerequisite: Phscs 561 or instructor's consent.

Sound production and perception, techniques for analysis and synthesis, computer modeling, machine recognition, and ensemble effects.

566. Architectural Acoustics and Noise. (3)

Prerequisite: Phscs 561 or instructor's consent.

Computer modeling of enclosures, techniques for measuring noise spectra, room design, noise control.

571. Laser Physics. (3)

Prerequisite: Phscs 222, Math 344; basic understanding of atomic physics and optics.

Physics of coherent radiation throughout the electromagnetic spectrum, including amplification and laser cavities. Discussion based on quantum mechanical principles, but mathematical treatment classical.

581. Solid-State Physics. (3)

Prerequisite: Phscs 222.

Introduction for students in physics, chemistry, geology, and engineering. Phenomena occurring in solids, and their related physical concepts.

591R. Colloquium. (0.5)

Required of all graduate students every semester in residence.

597R. Introduction to Research. (0.5)

One or two research areas to be selected. Twenty hours of participation required each semester.

611, 612. Astrophysics. (3 ea.)

Prerequisite: instructor's consent.

Theory of stellar atmospheres and interstellar matter.

617. Advanced Topics in Theoretical Physics. (3)

Applications of tensor analysis, differential geometry, and differential forms to such topics as mechanics, optics, relativity, and fluid dynamics.

618. Advanced Topics in Theoretical Physics. (3)

Introductory group theory. Basic representation theory and developments, with applications to quantum mechanics and molecular and solid-state physics.

619. Advanced Topics in Theoretical Physics. (3)

Prerequisite: Phscs 618.

Advanced group theory. Space groups and lie groups with applications in solid-state physics (energy band representations, phase transitions, etc.), nuclear physics, and quantum field theory (particle classification schemes, etc.).

621. Dynamics. (3)

Prerequisite: Phscs 321.

Advanced treatment of classical mechanics, including Lagrange's and Hamilton's equations, rigid body motion, and canonical transformations.

623. Dynamics of Continuous Media. (3)

Prerequisite: Phscs 621.

Mechanics of systems with an infinite number of degrees of freedom. Topics include elasticity and hydrodynamics.

625. Theory of Relativity. (3)

Prerequisite: Phscs 551, 621.

Review of special relativity and general relativity, with applications to modern astrophysics.

626. Relativistic Astrophysics. (3)

Prerequisite: Phscs 625.

Applications of general relativity to modern astrophysics, including gravitational collapse, black holes, cosmological models, gravitational waves, etc.

627, 628. Advanced Topics in Astrophysics. (3 ea.)

Prerequisite: instructor's consent.

Internal structure of stars; galactic structure.

631, 632. Statistical Mechanics. (3 ea.)

Prerequisite: Phscs 431, 551.

Advanced thermodynamics, classical statistical mechanics, quantum statistics, and transport theory.

636. Solar System Magneto-Plasma Interactions. (3)

Prerequisite: Phscs 536, 537.

Interactions of plasmas with atmospheres and surfaces of solar system objects such as planets, comets, and moons.

641, 642. Mathematical Theory of Electricity and Magnetism. (3 ea.)

Prerequisite: Phscs 442.

Advanced electrostatics and magnetostatics, Maxwell's equations and electromagnetic waves, relativistic electrodynamics, radiation theory, and interaction of matter with electromagnetic fields.

645, 646. Plasma Physics. (3 ea.)

Prerequisite: Phscs 431, 621, 642 for 645; Phscs 645 for 646.

Plasma state of matter, including a description in terms of both individual particles and fluids, with applications.

651, 652. Quantum Mechanics. (3 ea.)

Prerequisite: Phscs 518, 551.

Nonrelativistic quantum mechanics, with applications.

655, 656. Nuclear Physics. (3 ea.)

Prerequisite: Phscs 552.

Fundamental properties of nuclei, nuclear forces, nuclear models, electromagnetic properties of nuclei, particle radioactivity, nuclear reactions, and interaction of radiation with matter.

671. X-Ray Physics. (3)

Prerequisite: Phscs 518, 552, 581.

Physical characteristics of X-ray generation, optics, and experimental applications. Methods of X-ray imaging emphasized.

681, 682. Modern Theory of Solids. (3 ea.)

Prerequisite: Phscs 581, 651.

Quantum theory of solids, emphasizing the unifying principles of symmetry, energy-band theory, dynamics of electrons and of periodic lattices, and cooperative phenomena.

697R. Research. (1-6)

699R. Master's Thesis. (1-9)

711R. Advanced Topics in Physics. (1-3)

Prerequisite: instructor's consent.

Recent and upcoming topics include chaos, thin films, phase transformations, amorphous solids, quantum optics, astronomy using nontraditional frequencies, and particle physics.

751, 752. Advanced Quantum Theory. (3 ea.)

Prerequisite: Phscs 652.

Topics in relativistic quantum mechanics, including quantum field theory.

797R. Research. (1-9)

799R. Doctoral Dissertation. (1-9)

FACULTY

ALLRED, DAVID D., *Professor.* PhD, Princeton University, 1977. Lasers; X-Rays; Surface Physics.

BERRONDO, MANUEL, *Professor.* PhD, University of Uppsala, Sweden, 1969. Theoretical Physics.

CHRISTENSEN, CLARK G., *Associate Professor.* PhD, California Institute of Technology, 1972. Astrophysics.

DIBBLE, WILLIAM E., *Professor.* PhD, California Institute of Technology, 1960. X-Rays.

EVENSON, WILLIAM E., *Professor.* PhD, Iowa State University of Science and Technology, 1968. Theoretical Condensed Matter Physics.

HARRISON, B. KENT, *Professor.* PhD, Princeton University, 1959. General Relativity.

HART, GRANT W., *Associate Professor.* PhD, University of Maryland, 1983. Plasma Physics.

HATCH, DORIAN M., *Professor.* PhD, State University of New York, 1968. Theoretical Condensed Matter Physics; Group Theory.

HESS, BRET C., *Assistant Professor.* PhD, Iowa State University, 1988. Condensed Matter Physics.

JONES, STEVEN E., *Associate Professor.* PhD, Vanderbilt University, 1978. Muon Catalyzed Fusion

KNIGHT, LARRY V., *Professor.* PhD, Stanford University, 1965. Lasers; X-Rays.

LARSON, EVERETT GERALD, *Professor.* PhD, Massachusetts Institute of Technology, 1964. Theoretical Atomic Physics.

MASON, GRANT W., *Professor.* PhD, University of Utah, 1969. Plasma Physics.

MCMAMARA, D. HAROLD, *Professor.* PhD, University of California, Berkeley, 1950. Astrophysics.

MERRILL, JOHN J., *Professor.* PhD, California Institute of Technology, 1960. Instructional Design.

MOODY, JOSEPH WARD, *Assistant Professor.* PhD, University of Michigan, 1986. Astrophysics.

NELSON, H. MARK, *Professor.* PhD, Harvard University, 1960. Condensed Matter Physics.

RASBAND, S. NEIL, *Professor.* PhD, University of Utah, 1969. Theoretical Plasma Physics.

REES, LAWRENCE B., *Associate Professor.* PhD, University of Maryland, 1983. Nuclear Physics.

SOMMERFELDT, SCOTT D., *Assistant Professor.* PhD, Pennsylvania State University, 1989. Acoustics.

SPENCER, ROSS L., *Associate Professor.* PhD, University of Wisconsin, 1979. Theoretical Plasma Physics.

STOKES, HAROLD T., *Professor.* PhD, University of Utah, 1977. Condensed Matter Physics.

STRONG, WILLIAM J., *Professor.* PhD, Massachusetts Institute of Technology, 1964. Acoustics.

TAYLOR, BENJAMIN J., *Associate Professor*. PhD, University of California, Berkeley, 1969. Astrophysics.

TURLEY, R. STEVEN, *Associate Professor*. PhD, Massachusetts Institute of Technology, 1984. Computational and Atomic Physics.

VAN HUELE, JEAN-FRANÇOIS, *Associate Professor*. PhD, Brussels Free University, Belgium, 1987. Theoretical Physics.

POLITICAL SCIENCE

Chair: David B. Magleby

745 SWKT
PO Box 25545
Provo, UT 84602-5545
(801) 378-3423

THE PROGRAM OF STUDIES

The Department of Political Science currently offers only a joint BA/MA degree with an emphasis in public policy analysis. Undergraduate students interested in this program should consult with the department or refer to the BYU Undergraduate Catalog.

FACULTY

For faculty listings, refer to the BYU Undergraduate Catalog.

PSYCHOLOGY

Chair: David V. Stimpson

Graduate Coordinator: Kay H. Smith

Director of Clinical Training:
Bert P. Cundick

1001 SWKT
PO Box 25543
Provo, UT 84602-5543
(801) 378-4287

THE PROGRAM OF STUDIES

The mission of the Psychology Department is to discover, disseminate, and apply principles of psychology within a scholarly framework that is compatible with the values and purposes of Brigham Young University and its sponsor.

Three degrees are offered through the Department of Psychology: Psychology—MS, Psychology—PhD, and Clinical Psychology—PhD. The School Psychology Program is also offered as a cooperative program between the Departments of Psychology and Educational Psychology.

The average number of students admitted per year into the MS program and the clinical psychology program is ten each. Five students are admitted annually into the psychology PhD program. The average number of years to completion is two and a half for the MS and five for the PhD programs.

Psychology—MS

The master's degree in psychology provides advanced education in preparation for application to doctoral programs; community college, junior college, or high school teaching; and general strengthening of expertise in psychology. It is not intended as a terminal professional degree.

Admission and Entry.

- Semesters of entry and application deadlines: fall, January 31 (U.S. and international).

- Application requirements: minimum required GPA is 3.0 for the last 60 hours.
- Entrance examination: GRE general test.
- Prerequisite: baccalaureate degree in psychology (other fields will be considered); undergraduate major in psychology desirable. Previous course work should include general psychology, elementary psychological statistics, experimental psychology, and three additional psychology courses.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (699R).
- Required courses: Psych 501, 502 (first two semesters in residence), and three of Psych 510, 520, 540, 550, 560, 575, 583.
- Advisory committee selection: by the end of the first semester students must select their graduate committee and submit their study list.
- Electives: determined in consultation with graduate committee.
- Thesis.
- Examination: final oral examination on course work and defense of thesis.

Psychology—PhD

The doctoral program in psychology offers rigorous educational experience leading to the PhD degree. The first three semesters of the program are designed to provide broad coverage of the substantive areas of the field, training in research skills, and introduction to the particular areas of emphasis offered in the program. During the last two years of the program students will pursue specialized course work and training in one of five emphasis areas: (1) applied social psychology, (2) behavioral neurobiology, (3) instructional psychology, (4) learning and cognition, and (5) theoretical/philosophical psychology. The course work for these emphasis areas will be outlined under the supervision of the student's graduate committee.

During the first year students should select a faculty advisor and a graduate committee. All students will complete a common core of course work during the first three semesters. By the end of the second year in the program, all students will complete an MS degree, including a thesis. Following the completion of these requirements, students will concentrate on course work and research in the emphasis area they wish to pursue under the direction of the graduate committee.

Admission and Entry.

- Semesters of entry and application deadlines: fall, January 31 (U.S. and international).
- Entrance examination: GRE general test.

Requirements for Degree.

- Credit hours (63 plus skill): minimum 45 course work hours plus 18 dissertation hours (799R) and skill requirement hours.
- Required core courses: B grade or better in Psych 501, 502, 510, 540, 550, 560, 575, 583, 600R, 605, 606, 607.
- Sequence of program requirements:
First Year: fall, Psych 501, 550, 560, 605. winter, Psych 502, 540, 583, 606.
Second Year: fall, Psych 575, 600R, 607. By the end of the second year students should have completed and defended a master's thesis.
Third Year: students specialize in emphasis area(s), take course work selected in consultation with their graduate committee, complete skill requirements, and complete the specialty literature review project.
Fourth Year: this year is devoted to finishing course work and training in an emphasis area and to completing the dissertation. Students must complete 18 hours of dissertation credit (Psych 799R) as part of the dissertation requirement. **Note:** Psych 510 may be taken any time during the four years.
- Skill requirement: this requirement will be met by completing course work in the areas of mathematics, statistics, or computer science as approved by graduate committee to total 18 hours minimum. If Psych

501 and 502 are used toward completion of this requirement, they may not double count toward the core hour requirement.

- Examinations: by the end of their third year in the program (August), all students will complete and obtain approval on a major literature review in the emphasis area of their choice. This project should constitute a contribution to the field and demonstrate mastery of a body of research literature.
- Dissertation: by the end of their fourth year in the program, students should complete and defend a dissertation in their chosen emphasis area (including a journal article in a form acceptable for submission appended to the dissertation, unless exempted in individual cases by the dissertation committee and the program chair.)
- Other program requirements: all students will be required to complete a master's thesis by the end of their second year in the program.

Clinical Psychology—PhD

The clinical psychology training program at Brigham Young University is accredited by the American Psychological Association and leads to the PhD degree. This program is ordinarily completed in five years, including a one-year, full-time internship completed in an accredited agency. Candidates with varied backgrounds who have strong academic and clinical promise are recruited.

The philosophy of the clinical training program adheres to the scientist-professional model. Training focuses on academic and research competence as well as concentrating on the theory and practicum experiences necessary to develop strong clinical skills.

The program at Brigham Young University is eclectic in its theoretical approach, drawing from a wide range of theories and orientations in an attempt to give broad exposure to a diversity of traditional and innovative approaches. All students receive a basic core of training in adult clinical

psychology. They may also elect to take a special emphasis in (1) child, adolescent, and family; (2) clinical neuropsychology; (3) clinical research; or (4) values, religion, and mental health.

Admission and Entry.

- Semesters of entry and application deadlines: fall, January 31 (U.S. and international).
- Entrance examination: GRE general test.
- Prerequisite: course work in introductory, experimental, and abnormal psychology; statistics; personality; learning or cognition; and tests and measurements.

Requirements for Degree.

- Credit hours (124 minimum).
- Skill requirements: undergraduate statistics (3 hours); undergraduate research design and analysis (3 hours); research methodology (9 hours): Psych 500R (Measurement), Psych 500R (Design), Psych 500R (Clinical Research); graduate statistics (10 hours): Psych 501 or Stat 501, Psych 502 or Stat 502.
- General core courses (B grade or better except in Psych 645, 687R): biological bases of behavior (6 hours): Psych 583 or 585; 687R; social-cultural bases of behavior (6 hours): Psych 555, 645; cognitive-affective bases of behavior (3 hours): Psych 560 or 575; human development (3 hours): Psych 520; history and systems (3 hours): Psych 510; ethics and standards (3 hours): Psych 609.
- Clinical courses: assessment (9 hours): Psych 622, 623, 624; psychotherapy (12 hours): Psych 651, 652, 653, 654; personality and psychopathology (7 hours): Psych 611, 675; practicums, clerkships, and case conferences (29 hours minimum): Psych 740R, 741R, 743R; internship (6 hours): Psych 745, 746, 747, 748; dissertation (18 hours): Psych 799R.
- Emphasis sequences: a sequence of elective courses may be taken in the following emphasis areas: Child, Adolescent, and Family; Clinical Neuropsychology; Clinical Research; Values, Religion, and Mental Health.

- Dissertation (including a journal article in a form acceptable for submission appended to the dissertation) to be completed before internship.
- Internship: one-year internship in a setting approved by the clinical director. Before going on internship, students complete all other requirements.
- Examinations: (A) comprehensive examinations in first, second, and third years; (B) oral defense of dissertation.

For additional information about the program, write or call the secretary or the director of Clinical Training, 284 TLRB, PO Box 28610, Provo, UT 84602-8610, telephone (801) 378-4050.

School Psychology—SPC

This program is administered through the Department of Educational Psychology, and appropriate degrees and certificates are awarded through the College of Education. For further information regarding this program, see the description given in the Educational Psychology section of this catalog.

FINANCIAL ASSISTANCE

Departmental financial aid is manifest in various forms: teaching and research assistantships, student instructorships, and tuition awards.

RESOURCES AND OPPORTUNITIES

Comprehensive Clinic. This clinic is a unique interdisciplinary training and research facility housing the finest video and computer facilities available and a staff of skilled technicians and secretaries to support graduate student and faculty research. The clinic currently functions as a training facility for an APA-approved clinical psychology laboratory for the Psychology Department. In addition, the clinic provides the university and the broader geographical community with mental health services and serves between 200 and 250 clients each week. The clinic contains eleven

counseling rooms, four seminar rooms, and two large audiology and speech-language pathology classrooms equipped with video cameras and portable playback units. Fourteen small session rooms are equipped for audio recording.

Externship Opportunities. In addition to training experiences in the comprehensive clinic in clerkships, the clinical program arranges a number of reimbursed work placements for its students. These placements are under the supervision of a licensed psychologist who typically has an adjunct appointment in the Psychology Department. At present, externships are available in about eighteen different settings. They are coordinated through the clinical field placement supervisor and the director of clinical training. These experiences help students integrate classroom experiences with practical work applications.

Family, Home, and Social Sciences Computing Center. The center assists faculty and students with social science data processing and other computing needs on mainframe and personal computers. Technical support and consultation services for both statistics and graphics are available to students working on research projects, theses, and dissertations. Special computer facilities in the Psychology Department include time-share systems. These allow the simultaneous gathering of acoustical and voice perception data from human subjects and the gathering of learning and behavioral economics data from animal subjects.

Psychobiology Research

Laboratories. These laboratories are equipped with facilities for analysis of the relationships between brain function and behavioral expression in animals. Specifically, brain anatomical analyses can be done, and patterns of brain electrical activity can be studied.

Neuroimaging Laboratory. Current research and training in the area of neuroimaging are supported by a laboratory consisting of multiple com-

puter, video, data storage, and printer workstations supported by current software that allow for the capture, processing, isolation, and imaging output of specific areas of the brain from MRI and CRT images.

Multivariate Data Visualization Laboratory. Faculty and students interested in the areas of multivariate visualization of data and large-scale data analysis are supported by a mathematical psychology laboratory consisting of a DEC 3100 RISC UNIX workstation, networked to university mainframe computers as well as to IBM-compatible and Macintosh micro-computers.

The college also provides additional research and academic support through the Camilla Eyring Kimball Chair of Home and Family Life; the Lemuel H. Redd, Jr., Chair in Western History; the J. Fish and Lillian F. Smith Chair of Economics; and the Family History Services unit.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500R. Research Methods. (3)

Intermediate course for first-year graduate psychology students, focusing on methodological tactics rather than statistical skills.

501. Data Analysis in Psychological Research 1. (5)

Prerequisite: Psych 301 or Stat 222; or Stat 221, 223.

Using and interpreting major quantitative methods in psychology; some commonly used computer methods.

502. Data Analysis in Psychological Research 2. (5)

Prerequisite: Psych 501 or instructor's consent.

Analysis of variance and covariance, multiple regression, and experimental design; introduction to multivariate methods.

510. History and Systems of Psychology. (3)

Survey of origins and development of modern psychology, including consideration of schools and theoretical systems.

511. Philosophy of Science for the Social Sciences. (3)

Prerequisite: instructor's consent or admission to PhD program.

Issues in philosophy of science as they apply to social sciences, including considerations of method, epistemology, and construction of knowledge.

520. Advanced Developmental Psychology. (3)

Major research in developmental psychology, emphasizing theory, content, and methodology.

531. Organizational Psychology. (3)

Personal and interpersonal aspects of organizational life: goal setting, decision making, problem solving, communication, control, leadership, motivation, and change.

535. Behavior Modification Techniques. (3)

Practical application of behavior modification to academic discipline; emotional target behaviors of individuals and groups.

540. Personality Theory. (3)

Prerequisite: Psych 341 and 5 additional hours in psychology.

Contemporary theories of personality developed within framework of major psychological systems.

550. Theory and Research in Social Psychology. (3)

Prerequisite: Psych-Soc 350 or instructor's consent.

Current theories and research on interaction with others.

552. Applied Social Psychology. (3)

Prerequisite: Psych-Soc 350; graduate standing or instructor's consent.

Overview of domains in which social psychology theory and research have been applied outside the laboratory.

555. (Psych-Soc) Group Dynamics. (3)

Prerequisite: Psych-Soc 350.

Theories and research on small-group processes and mass behavior.

560. Learning Theory. (3)

Prerequisite: Psych 361 and 5 additional hours in psychology.

Critical review of current theories and persistent problems.

565. Motivational Psychology. (3)

Prerequisite: Psych 365 or equivalent; graduate standing or instructor's consent.

Theoretical, historical, and empirical overview; recent trends and issues; role of animal studies; methodological problems.

575. Cognitive Processes. (3)

Prerequisite: Psych 370, 375, or equivalent; graduate standing or instructor's consent.

Major theoretical and empirical developments. Interaction of sensory, perceptual, learning, and thinking processes.

577. (Psych-CS 535) Human/Computer Interaction. (3)

Prerequisite: graduate or senior standing.

Human/machine interfaces for hardware/software integration. Psychological principles of computer interfacing. Human engineering, ergonomics, software design principles for user-friendly applications.

583. Biological and Health Psychology. (3)

Prerequisite: Psych 381, 382, or equivalent.

In-depth examination of biological bases of behavior from perspective of health and disease.

584. (Psych-Zool) Neurophysiology. (3)

Prerequisite: Zool 460 or equivalent.

Physiology of nerve cells and neuronal interactions.

585. Human Neuropsychology. (3)

Prerequisite: Psych 381, 382; or instructor's consent.

Critical study of brain-behavior relationships.

586. Hormones and Behavior. (3)

Prerequisite: Psych 381, 382.

Neural and endocrine mechanisms underlying behavior.

587. Sensory and Perceptual Processes. (3)

Prerequisite: Psych 370, 381, 382; or instructor's consent.

Critical examination of sensory mechanisms and perceptual organization.

600R. Seminar in Research Methods. (3)

Prerequisite: Psych 501.

Research strategies, methods, and design including measurement, scaling, questionnaire construction, reliability, validity, and experimental and statistical designs.

605. Professional Seminar in Psychology. (1)

Prerequisite: acceptance into PhD program.

Introduction to major research areas in psychology.

606. Professional and Ethical Issues in Psychology. (1)

Prerequisite: acceptance into PhD program.

Ethical issues in professional and scientific psychology.

607. Research Prospectus Development. (1)

Prerequisite: acceptance into PhD program.

Supervised writing and research leading to completion and defense of prospectus for research thesis.

609. Professional and Ethical Issues in Clinical Psychology. (3)

Prerequisite: acceptance into clinical psychology program.

Ethical issues from a historical and contemporary framework.

610. Theory and Philosophy in Psychology. (3)

Prerequisite: instructor's consent or admission to PhD program.

Philosophical issues underlying psychology, including the nature and importance of theory and theorizing.

611. Psychopathology. (4)

Prerequisite: acceptance into clinical or school psychology program.

Etiology and symptoms of dysfunctional behavior and their effects on the individual, family, and community.

612. Psychopathology 2: Developmental. (3)

Prerequisite: acceptance into clinical or school psychology program.

Diagnosis and incidence of maladjustment, learning disabilities, abnormalities and subnormalities, and cultural deficits.

622. Assessment 1: Intelligence. (3)

Prerequisite: acceptance into clinical or school psychology program.

Methods used in assessing intellectual status in children and adults.

623. Assessment 2: Personality (3)

Prerequisite: acceptance into clinical or school psychology program.

Methods used in assessing the personality and behavioral characteristics of children and adults.

624. Assessment 3: Rorschach Technique. (3)

Prerequisite: acceptance into clinical or school psychology program.

Theory and skill training in administering, scoring, and interpreting the Rorschach Test.

625. Advanced Objective Assessment. (3)

Prerequisite: acceptance into clinical or school psychology program.

In-depth look at MMPI.

631. Professional Issues in Organizational Psychology. (3)

Prerequisite: Psych 531.

Consultant involvement in executive and management decision making, focusing on social responsibility and ethics.

640R. Seminar in Personality. (3)

Prerequisite: Psych 540.

Intensive analysis of selected current topics in personality research and theory.

641R. Values and Mental Health. (1-3)

Values and religious issues in personality, psychotherapy, prevention, and mental health education.

645. Cultural Diversity and Gender Issues. (3)

Clinical issues in the context of cultural diversity and contemporary social trends.

648R. Seminar in Theoretical/Philosophical Psychology. (3)

Prerequisite: instructor's consent or acceptance into PhD program.

Analysis of theoretical and philosophical issues in the discipline of psychology.

—Role of Theory in Psychotherapy
—Qualitative Research Methods

650R. Seminar in Social Psychology. (3)

Prerequisite: Psych 551 and instructor's consent.

Variable topics including attitude change, social cognition, prosocial and antisocial behavior, group dynamics, and organizational psychology.

651. Psychotherapy 1: Relationship and Psychodynamic (3)

Prerequisite: acceptance into clinical psychology program.

Theory and techniques employed in psychotherapy that focus on relationship and psychodynamic approaches.

652. Psychotherapy 2: Behavior and Cognitive (3)

Prerequisite: acceptance into clinical psychology program.

Theory and techniques employed in psychotherapy that focus on behavioral and cognitive approaches.

653. Psychotherapy 3: Child and Family. (3)

Prerequisite: acceptance into clinical psychology program.

Theory and techniques of child and family therapy.

654. Psychtherapy 4: Group. (3)

Prerequisite: acceptance into clinical psychology program.

Theory and techniques of small-group processes.

655. (Psych-Soc 630) Attitude Measurement and Change. (3)

Prerequisite: instructor's consent.

Attitude development, change, and assessment, focusing on both individual and mass persuasion.

660R. Seminar in Learning. (3)

Prerequisite: instructor's consent.

Critical review of contemporary literature in field of learning psychology.

667R. Seminar in the Experimental Analysis of Behavior. (3)

Prerequisite: instructor's consent.

Intensive overview of current trends and attendant philosophy. Principal attention given to research and philosophical journals.

675. Personality Dynamics. (3)

Prerequisite: acceptance into clinical psychology program.

Theories and applications to clinical situations.

677R. Seminar in Cognitive Processes. (3)

Prerequisite: Psych 575.

Advanced topics in cognitive science and applied artificial intelligence.

678R. Seminar in Mathematical Psychology. (3)

Variable topics including multivariate statistical methods, graphical data analytic techniques, and various mathematical models.

680. Clinical Neuropsychology. (3)

Prerequisite: acceptance into clinical psychology program and Psych 585.

Comprehensive study of the human dysfunctional brain.

684. Advanced Behavioral Neurobiology. (3)

Prerequisite: Psych 381, 382.

Intense examination of contemporary developments in psychobiology and behavioral neurosciences.

685R. Seminar in Behavioral Neurobiology. (3)

Critical examination of topics of current interest taken from contemporary literature.

687R. Seminar in Psychopharmacology. (3)

Prerequisite: Psych 585 or equivalent.

Major classes of psychoactive drugs, emphasizing drug-behavioral interactions.

691R. Intervention Techniques in the Schools. (3)

Rationale and procedures for working with children with educational and behavioral problems in school settings.

692R. Special Topics in School Psychology. (2)

Prerequisite: acceptance into school psychology program.

Computer use in school psychology.

695R. Independent Readings. (1-3)

Faculty-supervised readings as arranged by student.

697R. Independent Research. (1-4)

Prerequisite: instructor's consent.

Faculty-supervised research as arranged by student.

699R. Master's Thesis. (1-9)

Concluding research for master's program, culminating in final oral examination.

700R. Externships in Clinical Psychology. (0.5)

Supervised reimbursed experience in community agencies.

710R. Readings in Clinical Psychology. (1-3)

Prerequisite: acceptance into clinical psychology program.

Guided individual study in various topics.

711R. Topics in Clinical Psychology. (0.5-3)

Prerequisite: acceptance into clinical psychology program.

Theory and practice in specific topics.

712R. Topics in Neuropsychology. (3)

Prerequisite: Psych 680 and acceptance into clinical psychology program.

Current topics, including adult and child assessment. Other topics as determined by student interest.

740R. Case Conference. (0.5)

Prerequisite: acceptance into clinical psychology program.

Case presentations; professional, ethical, and research issues pertinent to assessment and intervention.

741R. Integrative Practicum. (1-3)

Prerequisite: acceptance into clinical psychology program.

Supervised assessment and intervention, integrating psychopathology diagnosis and treatment.

742R. Projects in Clinical Psychology. (3)

Prerequisite: acceptance into clinical psychology program.

Advanced study or skill training in various areas.

743R. Clerkship. (1-3)

Prerequisite: acceptance into clinical psychology program.

Supervised experience in community agencies.

745, 746, 747, 748. Clinical Internship. (2 ea.)

Prerequisite: acceptance into clinical psychology program.

Full-time training at approved mental health agency.

799R. Doctoral Dissertation. (1-9)

Concluding research for doctoral program, culminating in final oral examination.

FACULTY

- BALLIFF-SPANVILL, BONNIE**, *Professor*. PhD, Brigham Young University, 1966. Developmental Psychology.
- BARLOW, SALLY H.**, *Associate Professor*. PhD, University of Utah, 1978. Theory and Training in Individual and Group Therapy; Race and Gender Diversity; Advanced Objective Assessment.
- BEDNAR, RICHARD L.**, *Professor*. PhD, University of Minnesota, 1968. Theories of Group Work; Psychotherapy; Psychopathology.
- BERGIN, ALLEN E.**, *Professor*. PhD, Stanford University, 1960. Psychology and Religion; Personality Theory; Psychotherapy Research.
- BIGLER, ERIN D.**, *Professor*. PhD, Brigham Young University, 1974. Neuropsychology; Neuroanatomy; Neuroimaging.
- BLOCH, GEORGE J.**, *Associate Professor*. PhD, Stanford University, 1968. Physiological Psychology; Neuroendocrinology.
- BROWN, BRUCE L.**, *Professor*. PhD, McGill University, Canada, 1969. Psycholinguistics; Statistics and Research Methods.
- BUNKER, GARY L.**, *Professor*. PhD, University of California, Berkeley, 1966. Prejudice and Intergroup Relations.
- BURLINGAME, GARY M.**, *Associate Professor*. PhD, University of Utah, 1983. Short-Term Individual and Group Therapy; Research Design; Psychometrics.
- CLAYTON, CLAUDIA J.**, *Assistant Professor*. PhD, University of Utah, 1976; PhD, Brigham Young University, 1991. Biological Psychology; Treatment of Personality Disorders; Developmental Psychology.
- CUNDICK, BERT P.**, *Professor*. PhD, Ohio State University, 1962. Human Development and Assessment.
- ERVIN, GREGORY N.**, *Assistant Professor*. PhD, University of North Carolina, Chapel Hill, 1981. Psychobiology; Behavioral Pharmacology.
- FLEMING, DONOVAN E.**, *Professor*. PhD, Washington State University, 1962. Developmental Psychobiology; Neurophysiology; Sensory and Perceptual Processes.
- FUHRMAN, ADDIE**, *Dean of Graduate Studies, Professor*. PhD, University of Minnesota, 1969. Individual and Group Psychotherapy; Group Therapy Processes and Outcomes.
- HIGBEE, KENNETH L.**, *Professor*. PhD, Purdue University, 1970. Cognitive Psychology; Human Memory; Research Methodology.
- JENSEN, LARRY C.**, *Professor*. PhD, Michigan State University, 1966. Moral Development; Parenting; Gender Issues.
- LAMBERT, MICHAEL J.**, *Professor*. PhD, University of Utah, 1971. Research in Psychotherapy Process and Outcome; Sports Psychology.
- MAUGHAN, MICHAEL L.**, *Associate Professor*. EdD, Utah State University, 1970. Psychotherapy, Adult Development; Biofeedback/Stress Management.
- MILLER, HAROLD L., JR.**, *Professor*. PhD, Harvard University, 1975. Experimental Analysis of Learning and Motivation.
- NORTON, ELIZABETH**, *Assistant Professor*. PhD, Brigham Young University, 1978. Child Clinical; Psychological Factors Relating to Chronic and Terminal Illness in Children and Adolescents.
- ORME, G. CRAIG**, *Assistant Professor*. PhD, Utah State University, 1980. Clinical Application; Behavioral Medicine/Health Psychology; Crisis Intervention.
- PEDERSEN, DARHL M.**, *Professor*. PhD, University of Illinois, 1962. Quantitative Methods; Personality; Environmental and Sports Psychology.
- RIDGE, ROBERT D.**, *Assistant Professor*. PhD, University of Minnesota, 1993. Interpersonal Behavior; Social Behavior; Attitudes.
- ROBINSON, PAUL W.**, *Professor*. PhD, Utah State University, 1973. Behavior Modification; Analytical Methodology; Parenting.
- SLIFE, BRENT**, *Professor*. PhD, Purdue University, 1981. Theoretical/Philosophical; Theoretical Underpinnings of Personality and Psychotherapy; Systems Approaches to Therapy.
- SMITH, KAY H.**, *Professor*. PhD, Wayne State University, 1962. Group Dynamics; Attitude Measurement; Evaluation of Organizational Programs.
- SORENSEN, DAVID M.**, *Professor*. EdD, Harvard University, 1970. Psychodiagnostics; Human Development.
- STIMPSON, DAVID V.**, *Professor*. PhD, University of California, Berkeley, 1964. Attitude Formation and Change; Entrepreneurship; Leadership and Management.
- WEIGHT, DAVID G.**, *Professor*. PhD, University of Washington, 1969. Psychopathology; Assessment; Neuropsychology.
- WELLS, MARION GAWAIN**, *Associate Professor*. PhD, Purdue University, 1972. Psychotherapy; Clinical Child Psychology; Child and Adolescent Assessment.
- WILLIAMS, RICHARD N.**, *Professor*. PhD, Purdue University, 1981. Theoretical and Philosophical Foundations of Psychology.
- WOOD, LARRY EUGENE**, *Professor*. PhD, University of Iowa, 1971. Cognitive Psychology; Applications of Artificial Intelligence.

PUBLIC MANAGEMENT

Director: Lawrence C. Walters

760 TNRB
PO Box 23158
Provo, UT 84602-3158
(801) 378-4221

THE PROGRAM OF STUDIES

Institute of Public Management

Administered through the Institute of Public Management (IPM), the Master of Public Administration (MPA) Program prepares men and women for leadership in the public and not-for-profit sectors. Leadership in this context provides unique opportunities for service to others. The faculty and students of the MPA Program are dedicated to the philosophy that students should develop excellence in both knowledge and management skills, based on a solid ethical foundation. The success of this philosophy is demonstrated by the wide variety of leadership positions now held by alumni throughout the world. Graduates hold leadership positions in state and local governments, federal agencies, research organizations, business firms, and a variety of nonprofit organizations. They are city managers, personnel directors, policy analysts, and finance directors.

Today the public sector is called on to assist in areas that were traditionally the sole domain of profit organizations. Never before has there been a greater need for professionally trained public managers, and never before has there been greater opportunity for dedicated and qualified public managers to provide leadership in shaping the course of human affairs through public institutions and programs.

The Institute of Public Management offers two programs leading to the MPA degree: Public Administration—MPA and Executive Program—MPA. The preservice program is a two-year, full-time program; approximately

twenty-five to thirty students are admitted each year. The executive, or in-service program, is normally a three-year program taught one night a week; approximately thirty-five students are admitted to the Executive MPA Program each year. There are also two joint degrees: an MPA/JD degree and an MPA/nursing degree. Admission into joint programs is contingent upon acceptance into both programs.

Public Administration—MPA

The preservice MPA Program is designed to provide an understanding of the essential body of knowledge and to develop the basic skills needed for professional management. Such essentials include quantitative analysis, managerial economics, management philosophy and strategy, human resource management, accounting, budget and finance, ethics, and communication. These skills are taught through practical class and field experiences, case studies, formal and computer simulations, and special workshops and seminars. Second-year courses are designed around an individual's desired area of concentration. Such areas include: Local Government Management, Human Resource Management, Financial Management, and Public Policy Analysis. Emphasis in each of these concentrations is given to the conceptualization of the larger political and social issues as they relate to the administration of government programs.

Though the overall program is designed for the management of government and not-for-profit organizations, many MPA graduates have found their skills to be transferable to the private sector as well.

Admission and Entry.

- Semesters of entry and application deadlines: fall, March 1 for the preservice program and May 1 for the executive program (U.S.).
- Application requirements: minimum 3.0 GPA on a 4.0 scale for last 60 hours and a general career

interest in public management as reflected in a statement of intent.

- Entrance examination: GMAT (average 1995–96 score was 530)
- Prerequisite: upon acceptance, applicant will be informed of any background deficiencies.

Requirements for Degree.

- Credit hours: minimum 64 course work hours.
- Required courses:
Public Administration Environment: PMgt 610, 611, 682, 684.
Human Resource Management: PMgt 640, 641, 643; 671 or 681.
Financial Resource Management: PMgt 622, 629.
Decision Making and Analysis: PMgt 603, 630, 632, 685.
Communication: PMgt 660, 661.
- Electives: determined in consultation with faculty advisor. Some classes may be taken in other graduate departments.

The preceding does not represent the full range of requirements and opportunities in the program. See the Marriott School of Management Graduate Catalog for greater details.

Executive Program—MPA

Persons with significant public management experience who desire to pursue the master's degree program while continuing to work full-time are encouraged to apply. All courses in the program are offered in the evenings.

The Executive MPA Program consists of successful completion of at least 44 semester hours of approved course work. Classes are scheduled in such a way so that students will normally be able to take up to 6 hours per semester. On this schedule, students can complete the degree in eight semesters.

Admission and Entry.

- Semesters of entry and application deadlines: see preservice MPA Program.

- Application requirements: see preservice MPA Program. (**Note:** GMAT not required.)
- Prerequisite: applicants are required to have four years of full-time professional, administrative, or supervisory experience in the public sector, or the equivalent. Applicants must presently hold, or assume in the near future, a midlevel or higher administrative responsibility.

Requirements for Degree.

- Credit hours: minimum 44 course work hours.
- Required courses:
Public Administration Environment: PMgt 610, 611, 682, 684.
Human Resource Management: PMgt 640, 641, 643; 671 or 681.
Financial Resource Management: PMgt 622, 629.
Decision Making and Analysis: PMgt 603, 630, 632, 685.
Communication: PMgt 660, 661.

Joint Program—MPA/JD

Because of the unique advantages of a joint degree in law and public administration, the Institute of Public Management and the J. Reuben Clark Law School have approved a four-year joint degree program. This is possible because of the overlapping interests and direction of the two individual programs.

Joint Program—MPA/Nursing

This joint graduate program is for students enrolled in the Graduate Nursing Administration Program who desire a joint degree and who are currently working, or are planning to work, in the public sector. This degree is offered in conjunction with the Executive MPA Program. Applicants must meet the four-year minimum work experience requirement.

Inquiries regarding the Executive MPA Program, the MPA/JD Program, and the MPA/Nursing Program should be directed to the Institute of Public Management.

FINANCIAL ASSISTANCE

The Institute of Public Management utilizes Marriott School of Management financial aid provisions. Qualified students can receive aid from the following sources: the MSM Scholarship Fund, private scholarship donations, assistantship awards, and loan assistance.

The MPA Program currently has two private scholarships:

- The LeRoy and Agda Harlow City Management Scholarship.
- The Gale Wilson and City Management Friends of BYU Scholarship.

RESOURCES AND OPPORTUNITIES

The N. Eldon Tanner Building. The Tanner Building, which houses the Marriott School of Management, is one of the finest facilities of its kind. Surrounding the dramatic eight-story atrium at its center are lecture and seminar rooms, study rooms, a computer laboratory, and a working library.

The Marriott School of Management. The MSM is recognized as one of the outstanding management schools in the nation. Faculty are actively engaged in research and publication, and they fill leadership positions in a number of national professional organizations. The school has developed innovative educational programs that include internships, executive visitation programs, special student consulting and research projects, and other activities designed to bring management education and training closer to management practice. This is accomplished, in part, through the MSM's National Advisory Council, and the Executives on Campus Program.

The National Advisory Council. Consisting of sixty-five to seventy prominent business and government executives, the National Advisory Council lends major support to the Marriott School of Management. Students benefit by interacting with council members in special campus

lectures and seminars and by visiting or working with these executives in their respective organizations. Furthermore, the council assists students with placement opportunities, helps develop funding sources for scholarships, and provides professional development for faculty members.

The Executives on Campus Program. This program gives students an opportunity to interact with distinguished business and government leaders who come to campus. These executives visit classes and meet with student organizations as well as participate in the Executive Lecture Series and Entrepreneurship Lecture Series.

COURSE DESCRIPTIONS

603. Managerial Accounting and Computer Concepts. (1-4)

Accounting systems and processes emphasizing use of management control, financial analysis, decision making, performance evaluation. Spreadsheets and database management.

604. Management Cost Analysis. (1-3)

Discussion of accounting for the costs and benefits of programs, emphasizing cost analysis, cost control, and cost-based budgets and performance reports.

607. Program Evaluation. (3)

Basic principles, methods, and standards for financial and performance evaluation.

610. Managerial Economics. (1-3)

Utilizing economic concepts in the public sector, including an analysis of exchange, specialization, costs, markets for goods and services, and market failure.

611. Economic Environment of Public Administration. (2)

Introduction to international and national economic issues and their effect on the public administrator.

619R. Seminar in Economic Analysis. (1-3)

Advanced study in economics with variation in topics to meet current needs.

622. Budget and Finance. (3-4)

Acquisition and management of financial resources. Organization and responsibility for revenue sources, budget allocation, control, and planning.

624. Advanced Budgeting and Planning. (3)

Emphasis on forecasting revenues and service demands. Special focus on performance measures.

625. Debt Management. (3)

Advanced study of capital markets, debt instruments, bond issues, debt servicing, and financial disclosure requirements.

626. Tax Policy and Management. (3)

Seminar examining tax structure, impact, management, and other selected issues.

627. Cash Management and the Investment of Funds. (3)

Cash flow analysis, cash-based budgeting, treasury cash management, cash collection policies, short-term financing, and temporary investment of idle funds.

628. Managing Public Financial Resources. (2-3)

Applications-oriented approach to effective stewardship of public funds. Decision making techniques for collection, custodianship, control, and disbursement.

629R. Seminar in Financial Management. (1-3)

Advanced study in finance and accounting with variation in topics to meet current needs.

630. Statistical Analysis. (3)

Use of statistical techniques for decision making, emphasizing measurement, descriptive statistics, hypothesis testing, and regression.

632. Quantitative Methods. (1-3)

Selected quantitative approaches to analyzing management and policy issues, including linear programming, DEA, and other techniques.

635. Systems Analysis and Design. (3)

Application of business systems analysis and design to situations ranging from small intracompany functional units to large company-industry interactions.

638. Research Methods. (3)

Introduction to research methodology, including design, measurement, data collection, interpretation, and presentation.

640. Human Resource Management. (2-3)

Current theory and practice of human resource planning, job analysis, position classification, compensation, benefits, and labor relations.

641. Management and Organization Development. (2-3)

Organization structure and design, organizational motivation and control, and the management of change in organizations.

642R. Management Development Seminar. (1-3)

Workshops and seminars designed for personal growth development and assessment of decision-making skills.

643. Management Philosophy and Style. (3)

Experience-based class to help assess leadership style and develop a philosophy of management and an understanding of organization behavior.

644. Compensation and Benefits. (3)

Systems and procedures for determining and administering pay and employee benefits.

647. Human Resource Staffing. (3)

Staffing needs, planning, recruiting, and hiring.

649R. Seminar in Human Resource Management. (1-3)

Advanced study in human resource management with variation in topics to meet current needs.

659R. Seminar in International Management. (1-3)

Examination of international administration, with variation in topics to meet current needs, including comparative administration, technical assistance, and cultural restraints.

660. Written Communication. (1-2)

Development of written communication skills. Writing effective reports, memoranda, and other management documents.

661. Oral Communication. (1)

Developing oral communication skills.

671. Local Government Law. (1-3)

Introduction to contracts, torts, land use, and zoning.

674. Urban Issues. (3)

Major public policy issues facing urban government.

675. Urban Management. (3)

Administrative organization, municipal functions, communications, regulatory procedures, and intergovernmental relations.

676. Urban and Regional Planning. (3)

Basic principles of planning for urban government. Environmental impact statements, specific plans, and implementation procedures in urban planning.

679R. Seminar in Local Government Administration. (1-3)

Advanced study in local government administration with variation in topics to meet current needs.

681. Human Resource Law. (1-3)

Introduction to human resource law.

682. Ethics for Management. (3)

Forces operating on the manager and ethical considerations of leadership in a democratic, pluralistic society.

684. Environment and Process of Public Administration. (3)

Governmental, legal, political, and social environment of public administration.

685. Management Strategy and Organization Policy. (3)

Management approach to determining mission, goals, policy, and implementation of programs. Emphasis on environment, decision making, and utilization of human and financial resources.

687. Health and Human Service Issues. (3)

Health and other social policy issues, emphasizing their impact on organizations.

688. Business-Government Relations. (3)

Interaction between business and government organizations, including the influence of business leaders on public policy and regulation of business by government organizations.

689. Public Policy Analysis. (3)

Forces and events in the formulation of public policy. Concepts for analysis of public policy.

691R. Readings and Conference. (1-3)

Prerequisite: departmental consent.

Individualized reading and consultations.

692R. Directed Research. (1-3)

Prerequisite: departmental consent.

Application of research methods relative to managers.

693R. Practicum. (1-4)

Prerequisite: departmental consent.

Planned application of administrative concepts in a management work situation and analysis of the impact.

FACULTY

BRADY, F. NEIL, *Professor*. PhD, University of Texas, Austin, 1978. Ethics; Organizational Theory.

BUCKWALTER, DOYLE W., *Associate Professor*. PhD, University of Michigan, 1968. Urban Management; Public Policy.

CORNIA, GARY C., *Professor*. PhD, Ohio State University, 1979. Public Finance; Budgeting.

HART, DAVID KIRKWOOD, *Professor*. PhD, Claremont Graduate School, 1965. Ethics.

KNIGHTON, LENNIS M., *Professor*. PhD, Michigan State University, 1966. Accounting; Finance; Performance Evaluation.

PARSONS, ROBERT J., *Professor*. PhD, University of California, Riverside, 1971. Economics; Strategic Planning.

WALTERS, LAWRENCE C., *Associate Professor*. PhD, University of Pennsylvania, 1987. Quantitative Methods; Policy Analysis.

WHEELER, GLORIA E., *Associate Professor*. PhD, University of Michigan, 1972. Statistics; Human Resource Management.

WOLLER, GARY M., *Assistant Professor*. PhD, University of Rochester, 1992. Policy Analysis; Statistical Methods; International Management.

WRIGHT, N. DALE, *Professor*. PhD, University of Southern California, 1972. Organizational Behavior; Theory and Management Strategy.

RECREATION MANAGEMENT AND YOUTH LEADERSHIP

Chair: S. Harold Smith

Graduate Coordinator: Thomas S. Catherall

273-G RB
PO Box 22031
Provo, UT 84602-2031
(801) 378-4991

THE PROGRAM OF STUDIES

The Department of Recreation Management and Youth Leadership offers one degree: Recreation Administration—MS. The degree focuses on recreation management philosophy, theory, research, evaluation, and administration. Studies in optional interest areas such as therapy, outdoors, or youth leadership are only available through choice of an internship site in the professional program, or choice of a research subject in the thesis program.

Each spring the department accepts from ten to twelve new students who begin their studies sometime during the next year. Most of these students choose to begin their course work in the fall semester of that year, but others begin as early as spring or summer terms or as late as the winter semester of the next year. The average student graduates after two years of course work, which includes either an internship in the professional program or completion of a thesis in the thesis track.

Recreation Administration—MS

The MS degree has two program options: (1) the thesis program, which includes original research work and culminates in writing a thesis, or (2) the professional program, which involves extensive internship experience and writing two professional papers.

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, spring, summer, February 1 (U.S. and international).
- Entrance examination: GRE general test.
- GPA: minimum 3.0 for last 60 semester hours of undergraduate work.
- Prerequisite: undergraduate major or minor in recreation or youth leadership. Applicants with other backgrounds may be admitted provisionally but must complete selected prerequisite classes.

Requirements for Degree.

- Credit hours:
Thesis Option (30): 24 course work hours plus 6 thesis hours (RMYL 699R).
Professional Option (36): 33 course work hours plus 3 internship hours (RMYL 599R).
- Required courses: determined in consultation with graduate committee.
- Minor (optional): any approved minor.
- Thesis or internship.
- Examination: oral defense of thesis for thesis option; professional work for professional option.

FINANCIAL ASSISTANCE

Graduate awards are available in the form of assistantships and scholarships. Occasionally some graduate faculty members are awarded research grants that may include opportunities for paid research assistantships for department graduate students.

RESOURCES AND OPPORTUNITIES

Office of Youth Research and Development. The Department of Recreation Management and Youth Leadership sponsors the Office of Youth Research and Development. This research facility is the center of research, evaluation, and development work within the department. The research work within this center frequently utilizes the services of the department graduate students. It is also a resource for research materials concerning youth leadership topics.

Learning Resource Center. This center contains eighteen individual study areas for graduate students as well as computer, audio, and video equipment to assist them in their work.

Faculty research interests currently include: Family Recreation; Gerontology; Leisure Behavior; Educational Values of Play; Recreation Administration; Recreation Therapy; Community School Leadership; Youth Leadership; Youth at Risk.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

599R. Internship. (1-8)

Prerequisite: instructor's consent.
Professional leadership practicum.

600. Graduate Seminar. (1)

Requirements for graduates in RMYL, including APA format, library research, timetables, and deadlines; required courses and departmental procedures for both prospectus reviews and oral examinations.

610. Research Methods in Recreation. (3)

Preparing research proposals and guidelines for thesis writing.

611. Philosophical Foundations in Recreation. (3)

Prerequisite: formal acceptance into recreation management graduate program.

Review of philosophical foundations and conceptual bases for recreation and leisure in society.

615. Process Facilitation in Recreation. (2)

Identifying and applying various functions and roles of the recreation process facilitator.

619. Needs Assessment in Community Planning. (3)

Prerequisite: RMYL 610.

On-location data analysis and scientific report writing of a professional project.

650. Issues in Leisure and Recreation. (3)

Prerequisite: formal acceptance into recreation management graduate program.

Graduate seminar on current issues and trends in leisure studies and recreation.

685. Recreation Administration. (3)

Prerequisite: formal acceptance into recreation management graduate program.

Emphasis in managing, organizing, budgeting, and staffing issues, as well as personnel administration, policy development, strategic planning, administrative practices, etc.

694. Readings in Recreation Literature and Research. (2)

Readings from professional literature; group discussion.

699R. Master's Thesis. (1-9)

FACULTY

CATHERALL, THOMAS S., *Associate Professor*. EdD, Brigham Young University, 1980. Youth Research; Education and Play.

GRAY, HOWARD R., *Professor*. PhD, Pennsylvania State University, 1977. Therapy; Gerontology.

NAYLOR, JAY H., *Professor*. EdD, University of Utah, 1973. Administration.

NELSON, DOUGLAS C., *Assistant Professor*. PhD, University of New Mexico, 1995. Youth Research; Outdoor Recreation

OLSEN, BURTON K., *Associate Professor*. PhD, University of Minnesota, Minneapolis, 1970. Research.

SMITH, S. HAROLD, *Professor*. PhD, University of Utah, 1974. Family Recreation; Leisure Behavior.

THORSTENSON, CLARK T., *Professor*. PhD, University of Utah, 1969. Therapeutic Recreation.

WIDMER, MARK A., *Assistant Professor*. PhD, University of Utah, 1993. Therapeutic Recreation; Assessment; Adolescence.

RELIGION

Chair—Ancient Scripture: Stephen E. Robinson

375-A JSB
PO Box 25689
Provo, UT 84602-5689
(801) 378-2067

Chair—Church History and Doctrine: Richard O. Cowan

375-B JSB
PO Box 25690
Provo, UT 84602-5690
(801) 378-3691

THE PROGRAM OF STUDIES

Religious Education has two departments: the Department of Ancient Scripture and the Department of Church History and Doctrine. Both departments offer graduate minors but not graduate majors.

Ancient Scripture—Minor

Requirements for Degree.

- Credit hours:
Master's Level: minimum 9 approved hours, no more than 2 hours of which may be readings courses.
Doctoral Level: minimum 12 hours determined in consultation with major department chair.
- Required courses: determined with approval of Ancient Scripture Department chair. Courses in biblical languages such as Heb 331 and 531 or Greek 411, 612, and 613 that could strengthen a graduate minor in ancient scripture would be in addition to minimum hours required in religion.
- Advisory committee: must include one member from Ancient Scripture Department faculty.
- Credit limitation: no undergraduate credit may apply.

Church History and Doctrine—Minor

Requirements for Degree.

- Credit hours:
Master's Level: minimum 9 approved hours.
Doctoral Level: minimum 12 hours determined in consultation with major department chair.
- Required courses: determined with approval of Church History and Doctrine Department chair.
- Graduate committee: must include one member from Church History and Doctrine Department faculty.
- Credit limitation: no undergraduate credit may apply.

RESOURCES AND OPPORTUNITIES

Religious Studies Center. The dean of Religious Education is also the general director of the Religious Studies Center, which promotes research in ancient studies, the Bible, the Book of Mormon, LDS Church history, the Doctrine and Covenants, the Pearl of Great Price, and world religions.

The center is a supporting and coordinating agency for religion-oriented research throughout the university. Concentrating on research, writing, and other scholarly activities, it is not involved in classroom instruction or degree programs.

The Richard L. Evans Chair of Religious Understanding. The occupants of the Richard L. Evans Chair of Religious Understanding promote understanding among people of different faiths through teaching and other activities. The chair was established to articulate to a broad audience the religious values to which Elder Evans dedicated his life and to promote an enlightening exchange among Latter-day Saints, members of other faiths, and people of good will everywhere.

COURSE DESCRIPTIONS

Ancient Scripture

501. Analysis of the Old Testament: The Pentateuch and Historical Books. (3)

502. Analysis of the Old Testament: Prophetic Books. (2)

503. Analysis of the Old Testament: Poetic and Wisdom Literature. (2)

510R. Special Topics in Ancient Scripture. (1–3)

Prerequisite: LDS Church Seminaries and Institutes personnel only.

Subjects and questions typically addressed by Church Educational System instructors. No more than 3 hours may apply toward a graduate degree.

511. The Gospels. (2)

512. Paul's Life and Letters. (2)

513. The General Epistles and Revelation. (2)

514. Historical Background of the New Testament. (2)

521, 522. Analysis of the Book of Mormon. (3 ea.)

523. External Evidence of the Book of Mormon. (2)

527. History and Doctrines of the Pearl of Great Price. (3)

606. The Apocrypha and Pseudepigrapha. (2)

610R. Graduate Seminar in Ancient Scripture (1–3)

620R. Directed Readings in Ancient Scripture. (1–3)

Church History and Doctrine

510R. Special Topics in Church History and Doctrine.(1–3)

Prerequisite: LDS Church Seminaries and Institutes personnel only.

Subjects and questions typically addressed by Church Educational System instructors. No more than 3 hours may apply toward a graduate degree.

524, 525. Analysis of the Doctrine and Covenants. (3 ea.)

530. LDS Doctrine. (2)

540R. Special Topics in Church History and Doctrine. (2–3)

Independent Study available to commissioned and prospective chaplains only.

Topics include Joseph Smith's thought, Church doctrine, schismatic movements in Church history, historical setting of the Restoration, comparative American religions, Near Eastern religions, etc.

541. Documents of LDS Church History (1805–1844). (3)

542. Documents of LDS Church History (1844–1900). (3)

543. Documents of LDS Church History (Twentieth Century). (3)

551. History of the Early Church Through the Fourth Century. (3)

552. Medieval and Reformation Christianity. (3)

553. History of Christianity Since the Seventeenth Century. (3)

555. Monotheistic Religions of the World. (2)

Considers Zoroastrianism, Judaism, Christianity, Islam, Sikhism.

556. South and East Asian Religions. (2)

Considers Hinduism, Jainism, Buddhism, Confucianism, Taoism, Shintoism.

640R. Graduate Seminar in Church History and Doctrine. (1–3)

Topics include the Doctrine and Covenants, LDS church history, LDS doctrine, Christian history, Christian theology, world religions, etc.

650R. Directed Readings in Church History and Doctrine. (1–3)

Prerequisite: graduate standing and instructor's consent.

Topics include the Doctrine and Covenants, LDS Church history, LDS doctrine, Christian history, Christian theology, world religions, etc.

FACULTY

For faculty listings, refer to the BYU Undergraduate Catalog.

SECONDARY EDUCATION

Chair: C. Garn Coombs

Graduate Coordinator: D. Cecil Clark

110-D MCKB

PO Box 25093

Provo, UT 84602-5093

(801) 378-5889

THE PROGRAM OF STUDIES

The Department of Secondary Education does not offer a graduate degree but offers the following graduate courses.

COURSE DESCRIPTIONS

Note: ScEd 514R is for in-service education purposes only. Topics are listed in the BYU Undergraduate Catalog.

515R. Special Topics in Education. (1–3)

- Learning and Teaching
- Science Education
- Middle Education
- Teaching Reading in the Content Area

531. Effective Classroom Instruction. (2)

Developing strategies to initiate and to maintain effective learning in elementary and secondary classrooms. Expanding teaching perspectives and acquiring observation skills.

539R. Practicum in Learning and Teaching. (1–8)

Experience in a school setting under direction of college faculty.

601. Structure, Function, and Outcomes of Education. (3)

Relationships between purposes of education and means selected to achieve those aims. Establishing and maintaining integrity in educational practice.

606. Western Educational Thought and Practice. (3)

History of educational thought and practice, including pedagogical reform, national systems, and recent trends.

607. Multicultural Education. (3)

Exploring common cultural universals from archaic and modern societies to develop skills for learning within a culturally diverse environment.

649. College and Adult Basic**Reading. (2)**

Prerequisite: one course in reading or instructor's consent.

Adult basic education programs; advanced work in community college and university reading services.

660. Historical Foundations in**Reading. (2)**

In-depth study of the history of reading education, books, and reading instruction, with implications for present-day reading practices.

693R. Directed Individual**Study. (1-4)****698R. Master's Project. (1-6)****699R. Master's Thesis. (1-6)****FACULTY**

For faculty listings, refer to the BYU Undergraduate Catalog.

SOCIAL WORK

Director: Kyle L. Pehrson

Associate Director: Wanda M. Spaid
Graduate Coordinator: Michael M. O. Seipel

Fieldwork Director: W. Eugene Gibbons

221 KMB
PO Box 24472
Provo, UT 84602-4472
(801) 378-3282

THE PROGRAM OF STUDIES**School of Social Work**

The School of Social Work is committed to the general objective of the social work profession, which is to promote the general welfare of society by enhancing the social functioning of individuals, families, groups, organizations, and communities. The goal of the MSW program is to prepare students for the practice of clinical social work, with an emphasis on work with the family and children. The School of Social Work offers a core curriculum in the basic knowledge, skills, and values essential to all social work practice.

One degree is offered in the School of Social Work: Social Work—MSW.

Approximately thirty students are admitted to the MSW program each fall semester. Candidates usually pursue the degree over a contiguous twenty-month period, which includes 1,100 clock hours of field practicum.

Social Work—MSW

The curriculum is designed around a psychosocial approach to practice within an integrating framework of systems theory. This approach will allow the practitioner to be responsive to the special issues of diversity in a pluralistic society.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Entrance examination: at school's discretion.
- Prerequisite: applicants are expected to have prepared themselves for the MSW program by completing course work and developing a base of knowledge and skill in the following areas: (a) research*, statistics* (5 hours); (b) human biology* (3 hours); (c) behavioral sciences (3 hours), abnormal behavior*; (d) social sciences (3 hours), i.e., social psychology, sociological theory, social organization, political science, etc.; (e) introduction to social work course.*

*Specifically required.

Requirements for Degree.

- Credit hours: minimum 64 course work hours distributed as follows: social work practice courses (17 hours); human behavior and social environment (10 hours); social welfare policy (6 hours); research (7 hours); professional seminar (2 hours); field practicum (14 hours); electives (8 hours).
- Electives: 8 hours, 6 of which are clinical. In addition to the required courses, MSW candidates must select at least one elective from SocW 638, 641, 647R (Play Therapy). The remaining electives may be chosen from among other social work electives. One of the elective classes may be selected from a variety of clinical/family courses outside the school or from other educational opportunities to be negotiated with the faculty advisor.
- Optional research project (SocW 698R).
- Students who enter with an undergraduate social work degree will complete 58 total credit hours (instead of 64). Credit is given for 12 hours. Six of those 12 hours must be substituted with other electives.

FINANCIAL ASSISTANCE

Financial assistance is available through university funds. Research

and graduate assistantships, field internships, and scholarships for ethnic minority students are available through the School of Social Work.

RESOURCES AND OPPORTUNITIES

The School of Social Work utilizes the Comprehensive Clinic, an interdisciplinary training and research facility. The facility houses state-of-the-art video and computer equipment, as well as a staff of skilled technicians and secretaries to support graduate student and faculty research. Faculty and student research is also facilitated through the school's Social Work Research Center. In addition, graduate students access the Family and Demographic Research Institute and the Women's Research Institute. Students who plan on further graduate work are encouraged to conduct individual research or work with a faculty member.

Faculty research interests currently include: poverty; gerontology; family violence; mental health; military social work and civil defense; health care; women and gender.

For a more detailed description of the graduate program requirements, send for a copy of the school's bulletin.

COURSE DESCRIPTIONS

550 Crisis Intervention. (3)

Assessment and intervention in crisis situations with clients.

595R. Directed Readings. (1-3)

Prerequisite: instructor's consent.

600. Social Work Research. (2)

Overview and application of qualitative and quantitative social work research and statistical analysis. Issues of research ethics and oppressed populations. For majors only.

601. Program and Practice Evaluation. (2)

Prerequisite: SocW 600.

Methods of social work program evaluation, including application of descriptive and inferential statistics. In-class program and practice evaluation project required. For majors only.

602. Measures for Clinical Practice. (2)

Prerequisite: SocW 600.

Assessment, administration, and interpretation of standardized psychological tests for social work clinical practice.

612. Human Behavior and Social Environment 3: Psychopathology. (3)

Prerequisite: Psych 342 or equivalent; SocW 620.

Etiology and symptoms of dysfunctional behavior and their effects on the individual, family, and community. Majors only.

620. Human Behavior and Social Environment 1: Child, Youth, and Young Adult Development. (3)

Development of children, adolescents, and young adults as individuals and members of families, other groups, organizations, and communities. Cultural, social, psychological, biological, spiritual, physical forces.

621. Human Behavior and Social Environment 2: Adult Development and Aging. (2)

Prerequisite: SocW 620.

Development in middle and later adulthood as individuals and members of families, other groups, organizations, and communities. Cultural, social, psychological, biological, spiritual, and physical forces. For majors only.

623. Cultural Diversity Seminar. (1)

Social, cultural, ethnic, and racial experiences, needs, and beliefs of diverse persons.

630. Social Welfare Policy 1: A Framework for Analysis, Goal Setting, and Change. (3)

Analyzing and changing social policies and programs. For majors only.

631. Social Welfare Policy 2: Social Work and Family Law. (3)

Prerequisite: SocW 630.

The law relative to formation, functioning, and dissolution of families and delivery of social services to them. For majors only.

638. Practice in Child Services. (2)

Prerequisite: instructor's consent.

Working with the social service delivery system on problems related to child neglect and abuse, foster care, adoptions, etc.

641. Interventive Methods with Children and Adolescents. (2)

Prerequisite: instructor's consent.

Use of interventive methods in treating child and adolescent problems in addition to understanding reciprocal impact of significant systems, i.e., school, family, peers, church, health.

642. Marriage and Family Theories and Treatment. (2)

Prerequisite: instructor's consent.

Various models of marriage and family treatment; appropriate intervention skills. For majors only.

643. Advanced Marriage and Family Practice. (2)

Prerequisite: SocW 642.

Advanced methods of intervention with marital dyads, family, and community. For majors only.

644. Clinical Intervention with Special Populations. (2)

Prerequisite: instructor's consent.

Applying core clinical practice skills to distinct groups representing racial, ethnic, and cultural diversity.

645. Theological Perspectives on Social Work Practice. (2)

Prerequisite: instructor's consent.

Interface of religious and social work values, attitudes, and principles.

646. Women's Issues in Social Work Practice. (2)

Prerequisite: instructor's consent.

Social work practice and specific problems and issues associated with both genders but focusing on changing expectations and roles of women.

647R. Special Topics in Advanced Clinical Practice. (2)

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Object Relations Therapy
- Cognitive Therapy
- Understanding the Professional Self and the Therapeutic Alliance
- Play Therapy
- Family Preservation

648. Selected Fields of Practice. (2)

Prerequisite: instructor's consent.

Current problems and treatments in social work practice, such as family violence, addiction, and human sexuality.

654R. Field Practicum. (1-3)

Prerequisite: first-year placement.

Practicum in social service agencies with an integrative seminar to examine relationship between theory and practice. For majors only.

655R. Field Practicum. (1-3)

Prerequisite: second-year placement.

Practicum in social service agencies with an integrative seminar to examine relationship between theory and practice. For majors only.

660. Social Work Practice: Casework. (2)

Prerequisite: SocW 620 or concurrent registration.

Psychosocial assessment of individuals and implementing interventions. Skills laboratory required. For majors only.

661. Social Work Practice: Advanced Casework. (3)

Prerequisite: SocW 660.

Building on skills acquired in SocW 660; using different microintervention models and approaches. For majors only.

662. Social Work Practice: Group Work. (2)

Prerequisite: SocW 620 or concurrent registration.

Structure, function, dynamics, and development of small groups, emphasizing group models and group theory. For majors only.

663. Social Work Practice: Advanced Group Work. (2)

Prerequisite: SocW 662.

Applying group theory to individual and family problems. Role of social workers in group process. Group leadership experience required. For majors only.

664. Social Work Practice: Community Organization. (2)

Prerequisite: SocW 621 or concurrent registration.

Basic practice theory, tactics, and strategies in working with neighborhoods, communities, and organizations toward planned change. For majors only.

665. Social Work Practice: Introduction to Human Services Administration. (2)

Key managerial functions of complex organizations and institutions; administrative theory and selected management techniques. For majors only.

666. Social Work Practice: Advanced Clinical Methods in Assessment/Intervention. (2)

Prerequisite: SocW 661.

Linking psychosocial assessment with advanced clinical theory, skills, and techniques. For majors only.

693R. Seminar in Professional Philosophy, Values, and Ethics of Social Work Practice. (2)

Philosophical and ethical basis for social work and family therapy practice, including integrative framework for defining and implementing professional practice. For majors only.

698R. Master's Research Project. (1-3)

Prerequisite: SocW 600, 602.

Applying research and statistical methods to evaluative, experimental, and survey studies in social work. Research report of publishable quality required. For majors only.

FACULTY

BLAKE, REED H., *Professor*. PhD, Utah State University, 1969. Disaster Planning.

COX, SHIRLEY, *Associate Professor*. DSW, University of Utah, 1986. Ethical Issues; International and Field Practice.

GIBBONS, W. EUGENE, *Professor*. DSW, University of Utah, 1974. Mental Health; Gerontology.

HORTON, ANNE L., *Associate Professor*. PhD, University of Wisconsin, Madison, 1983. Child and Spouse Abuse; Domestic Violence.

MARETT, KEVIN M., *Assistant Professor*. PhD, Purdue University, 1989. Marriage and Family; Prevention.

MATHESON, KENNETH W., *Associate Professor*. DSW, University of Utah, 1976. Teaching; School Social Work; Direct Clinic Practice; Supervision; Marriage and Family Therapy.

NORMAN, JUDITH L., *Assistant Professor*. DSW, University of Utah, 1990. Mood Disorders; Gender.

PEARSON, DALE F., *Assistant Professor*. PhD, Brigham Young University, 1981. African American Males; HIV and AIDS.

PEHRSON, K. LYNN, *Professor*. DSW, Catholic University, 1980. Military Social Work.

SEIPEL, MICHAEL M. O., *Associate Professor*. PhD, Cornell University, 1982. Health Care in Developing Countries.

SPAUD, WANDA M., *Associate Professor*. DSW, University of Utah, 1989. Gerontology; Mental Illness.

TANNER, ELVIN R., *Professor*. PhD, Brigham Young University, 1969.

WALTON, ELAINE, *Assistant Professor*. PhD, University of Utah, 1991. Clinic Practice and Program Evaluation; Family Preservation Services.

SOCIOLOGY

Chair: Stephen J. Bahr
Graduate Coordinator: Darwin L. Thomas

800 SWKT
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 (801) 378-6706

THE PROGRAM OF STUDIES

The Sociology Department trains graduate students to become capable teachers of sociology and skilled researchers and seeks to maintain excellence in research among faculty, assuring quality instruction as well as providing opportunities for student research involvement.

The Department of Sociology offers three degrees: Sociology—MS, Sociology—PhD, and Family Studies—PhD (furloughed).

The Sociology Department admits an average of eleven students to both the master's and doctoral programs each fall semester. Full-time students will normally finish a master's degree in two years and a doctoral degree in four years.

Sociology—MS

The purpose of the master's degree in sociology is to prepare students for doctoral work and to train them as teachers and researchers.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination is GRE general test.
- Prerequisite: baccalaureate degree in sociology or equivalent.

Requirements for Degree.

- Credit hours (minimum 30): 24 course work hours, including at least 15 hours of formal course work in sociology, plus 6 hours of

thesis (Soc 699R) or 6 hours of project (Soc 698R). Only course work with a grade of B– or better is acceptable.

- Required courses: Soc 600, 606, 611; 620 or 650; demonstration of competence in sociological theory, research methods, and statistics.
- Thesis or project.
- Examination: oral defense of thesis or project.

Sociology—PhD

Students who desire a PhD in sociology may pursue a contemporary sociology track or one in studies of the family. Students in the contemporary sociology track will be expected to specialize in social organization, social psychology, or sociology of religion. Students in the studies of the family track will complete course work in sociology of the family and family courses in related disciplines such as anthropology or psychology. All PhD students are encouraged to be actively involved with faculty in research and publication.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international)
- Application requirements: entrance examination is GRE general test.
- Prerequisite: master's degree in sociology or equivalent; master's thesis.

Requirements for Degree.

- Credit hours (66 plus skill): 48 hours of approved course work, plus 18 dissertation hours (Soc 799R) and the skill requirement. Only course work with a grade of B– or better is acceptable.
- Required courses: Soc 706, 711; minimum 6 hours selected from Soc 601, 602, 604, 608; minimum 9 hours in each of two specialty areas selected for comprehensive examinations; demonstration of competence at the doctoral level by required course work and by examination in sociological theory, research methods, and statistics.
- Language/Skill requirement:

Single Language Option: in-depth proficiency.

Two Languages Option: reading ability.

One Language and Skill Option: reading ability in French, German, Spanish, or Russian; 8–10 hours of statistics, computer science, and mathematics, or of Soc 400, 504, 608, 706; FamSc 602.

Single Skill Option: minimum 18 hours, approved by graduate committee, of statistics, computer science, and mathematics, or of courses listed in preceding One Language and Skill Option.

- Dissertation.
- Examinations: (A) written comprehensive examination in two of the following areas of emphasis: family sociology, social psychology, social organization, or religion; (B) oral defense of dissertation prospectus.
- Oral defense of dissertation.

Family Studies—PhD

(Interdepartmental)

This program has been furloughed. For information regarding the program, contact the Family, Home, and Social Science dean's office, 990 SWKT, PO Box 25535, Provo, UT 84602-5535, telephone (801) 378-2083.

FINANCIAL ASSISTANCE

The Sociology Department offers some tuition assistance to students as well as research assistantships and teaching opportunities. Financial assistance is also available through other agencies in the university.

RESOURCES AND OPPORTUNITIES

The Department of Sociology utilizes the Center for Studies of the Family, and the Women's Research Institute.

The Center for Studies of the Family is an interdisciplinary research center focusing on studies related to all aspects of the family. The institute encourages and supports research on family-related topics ranging from prenatal development to problems of aging.

For the past six years, sociology faculty have participated with the Church Educational System in the CES/Family Doctoral Research Fellowship Program. Three research fellows are chosen every three years who, under faculty direction, carry out a research project. For information about this program, contact the Department of Sociology.

Initially established in 1978, the Women's Research Institute became a part of the College of Family, Home, and Social Sciences in September 1983. Since then the institute has awarded research fellowships to upper-division and graduate students for conducting research on women and women's issues in amounts up to \$500 annually for selected projects.

Faculty research interests cover a broad spectrum of social science research. However, the make-up of the department faculty generates most research in the following areas: Family; Social Psychology; Religion; Social Organization.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

503. Advanced Social Science Computing. (3)

Prerequisite: Soc 303, 400, or instructor's consent.

Appropriate use of computer technology and software in social science scholarship and research: data acquisition and management, advanced statistical methods, computer information retrieval and exchange.

504. Mathematical Sociology. (3)

Prerequisite: Math 105.

Mathematical techniques of simulating and modeling social processes.

515. Seminar in Sociological Practice. (3)

Prerequisite: Soc 315, 600, 606, 610.

Uses of sociological theory and methods to deal with individual, organizational, and societal problems. Techniques for communicating such knowledge to the nonsociologist.

524. Advanced Political Sociology. (3)

Social basis of political behavior. Modern theories and research concerning use of power and decision making.

525. Sociology of Religion. (3)

Prerequisite: Soc 111, 325, or instructor's consent.

Influences of social factors in the development of various religious systems.

527. Sociology of the LDS Church and Its People. (3)

The LDS Church from a social science perspective, including the Church as a new religious movement; LDS culture; the institutionalization process.

528. Sociology of Rural Communities. (3)

Prerequisite: Soc 311, 370, or instructor's consent.

Review and critique of major theoretical and methodological approaches to the study of community, with a focus on rural communities.

530. Sociology of International Development. (3)

Major theoretical paradigms of development with strategies and practical application in the international setting.

545. Population Analysis. (3)

Prerequisite: Soc 205 or equivalent.

Availability, use, and interpretation of population data for local, state, and national areas applied to planning and evaluation.

550. (Soc-FamSc) History and Development of Theory About the Family. (3)

Prerequisite: FamSc 250, Soc 311, or equivalent.

Historical/intellectual roots of theorizing about families; paradigms and assumptions underlying theorizing; contemporary research and theory interface.

560. Contemporary Theories About the Family. (3)

Prerequisite: Soc 550 or instructor's consent.

Contemporary theories and research about the family, emphasizing role, exchange, and systems theories.

561. The Family Institution. (3)

The family in different societies; problems created by various family systems.

565. (Soc-FamSc 663) The Individual and Family in Later Years. (3)

Developmental aspects of aging, focusing on the biophysical, cognitive, social, affective, and pathological dimensions in people aged fifty and over.

590R. Special Topics in Sociology. (1-3)

Prerequisite: instructor's consent.

Course content varies from year to year.

595R. Directed Readings. (1-3)

Individualized reading program supervised by faculty member. Pass/Fail only.

600. (Soc-FamSc) Advanced Research Methods. (3)

Prerequisite: Soc 300 or equivalent.

Training in survey, experimental, secondary, and content analysis; qualitative, evaluation, and environmental impact research techniques.

601. (Soc-FamSc) Seminar in Survey Research. (3)

Prerequisite: Soc-FamSc 600 or equivalent.

Survey research techniques of the behavioral sciences; emphasizes research and sampling designs.

602. (Soc-FamSc) Experimental Design. (3)

Prerequisite: Soc-FamSc 600, Stat 501 or equivalent, or instructor's consent.

Research methods, logic, writing, and data analysis.

603R. (Soc-FamSc) Research Practicum. (3)

Prerequisite: instructor's consent.

Design, data collection, data analysis, and write-up.

604. Ethnographic Research Techniques. (3)

Prerequisite: Soc-FamSc 600.

Rationale, methods, and limitations of qualitative research; includes participant observation and hermeneutic skills.

606. Intermediate Statistics. (3)

Prerequisite: Soc 205 or equivalent; Soc 400 or concurrent registration.

Probability, estimation, hypothesis testing, correlation analysis, multiple regression, analysis of variance, and nonparametric methods for sociologists and other social scientists.

608. Sociological Measurement. (3)

Prerequisite: Soc-FamSc 600, Soc 606.

Unidimensional and multidimensional measurement techniques, emphasizing theoretical, methodological, and substantive consequences of technique selection.

611. Seminar in Contemporary Sociological Theory. (3)

Prerequisite: Soc 311.

Contemporary theories: structural functionalism, conflict theory, exchange theory, and symbolic interactionism.

612. Seminar in the Development of Sociological Theory. (3)

Prerequisite: Soc 610.

Contributions of sociological theorists, including Durkheim, Weber, Pareto, and Simmel.

620. Theory and Research in Social Organization. (3)

Prerequisite: admission to graduate sociology programs; others admitted by instructor's consent.

Graduate survey of the field of social organization and the core sub-fields therein.

621. Complex Organizations. (3)

Prerequisite: instructor's consent.

Theoretical approaches and empirical studies of organizations, their structures, processes, and problems; studies of industrial organizations, universities, hospitals, etc.

622. Social Stratification. (3)

Prerequisite: Soc 111.

Status, class, and power systems in various societies.

623. Seminar in Race and Ethnic Relations. (3)

Major theories of race-ethnic relations; critical issues in the field.

625R. Seminar in the Sociology of Religion. (3)

In-depth analysis of theory and research in topical areas of the sociology of religion. Course content varies from year to year.

630. (Soc-Psych 655) Attitude Measurement and Change. (3)

Prerequisite: instructor's consent.

Attitude development, change, and assessment, focusing on both individual and mass persuasion.

637. Sociology of Feminist Theory. (3)

Prerequisite: Soc 367.

Analysis of traditionally accepted models by Freud, Erikson, and Kohlberg from a feminist perspective; review of the works of such contemporary theorists as Chodorow, Gilligan and Elshtain; French and American differences.

650. Advanced Social Psychology. (3)

Processes of social influence, emphasizing theory and research testing. Basic principles of social behavior.

660. (Soc-FamSc) Child and Adolescent Socialization. (3)

Child and adolescent development in the context of social interaction, with particular emphasis on the family. Current theory and research evaluated.

670. Contemporary Urban Social Structure. (3)

Prerequisite: Soc 370.

Research-oriented examination of social forces in contemporary urban life that influence patterns of human interaction.

678. Social Policy and Feminist Legal Thought. (3)

Prerequisite: instructor's consent and departmental approval; law students have priority. (Taught by law instructor with law students in class.)

Survey of recent literature regarding the impact of women on law and legal institutions and the impact of law and legal institutions on the definitions, roles, and status of women in our society.

681R. Seminar in Deviance, Crime, and Corrections. (3)

Prerequisite: Soc 380, 381 or 383, or instructor's consent.

In-depth analysis of current issues in the field. Tailored to student interests.

692R. (Soc-FamSc) Seminar in Family Relationships. (3)

Prerequisite: Soc-FamSc 560.

Theory and research in topical areas of family study (topics presented on alternate years):

- Marital Stability
- Power and Gender Roles
- Marital Quality and Communication
- Family, Religion, and Education
- Household and Family Demography

697R. Directed Research. (1-3)

699R. Master's Thesis. (1-6)

706. Advanced Statistical Methods. (3)

Prerequisite: Soc 606.

Advanced multivariate analysis; analysis of variance and covariance, multiple regression, linear models, latent variables, log-linear models, event history analysis.

711. Sociological Theory and Theory Building. (3)

Prerequisite: Soc-FamSc 600, Soc 606, 610.

Latest contributions to theory; current endeavors in construction of sociological theories.

720R. Seminar: Social Organization. (1-3)

Prerequisite: Soc 111, 620.

750. Seminar: Social Psychology. (3)

Prerequisite: Soc-Psych 650.

Evaluation of current cutting edge theory and research. Course content varies as course is offered every other year.

792R. (Soc-FamSc) Family Symposium. (0.5)

799R. Doctoral Dissertation. (1-9)

FACULTY

BAHR, HOWARD M., *Professor.* PhD, University of Texas, Austin, 1965. Urban Problems; Ethnic Relations.

BAHR, STEPHEN J., *Professor.* PhD, Washington State University, 1972. Family; Deviance.

BARBER, BRIAN, *Associate Professor.* PhD, Brigham Young University, 1987. Sociology of the Family.

CALL, VAUGHN, *Associate Professor.* PhD, Washington State University, 1977. Family Life Course; Research Methods.

CHADWICK, BRUCE A., *Professor.* PhD, Washington University, 1967. Research Methods; Family.

CORNWALL, MARIE, *Associate Professor.* PhD, University of Minnesota, 1985. Religion; Family.

DUKE, JAMES B., *Assistant Professor.* PhD, Harvard University, 1991. Social Stratification; Sociology of Education.

DUKE, JAMES T., *Professor.* PhD, University of California, Los Angeles, 1963. Sociological Theory; Sociology of Religion.

ENGLAND, J. LYNN, *Professor.* PhD, University of Pittsburgh, 1971. Theory; Community.

FORSTE, RENATA, *Assistant Professor.* PhD, University of Chicago, 1992. Demography; Statistics.

HEATON, TIM B., *Professor.* PhD, University of Wisconsin, Madison, 1979. Demography; Rural Sociology.

JACOBSON, CARDELL K., *Professor.* PhD, University of North Carolina, Chapel Hill, 1971. Social Psychology; American Race/Ethnic Relations.

JOHNSON, BARRY L., *Professor.* PhD, University of North Carolina, 1977. Statistics; Medical Sociology.

JOHNSON, RICHARD E., *Associate Professor.* PhD, University of Washington, 1976. Deviance; Criminology.

KUNZ, PHILLIP R., *Professor.* PhD, University of Michigan, 1967. Complex Organization; Population.

SEGGAR, JOHN F., *Professor.* PhD, University of Kentucky, 1968. Social Organization; Social Psychology.

THOMAS, DARWIN L., *Professor.* PhD, University of Minnesota, St. Paul, 1968. Family; Social Psychology.

TORRES, JOHN C., *Assistant Professor.* PhD, Stanford University, 1995. Complex Organization; Political Sociology.

WARD, CAROL J., *Assistant Professor.* PhD, University of Chicago, 1992. Race and Ethnic Relations; Sociology of Education.

WARNER, W. KEITH, *Professor.* PhD, Cornell University, 1960. Complex Organization; Social Organization.

YOUNG, LAWRENCE A., *Associate Professor.* PhD, University of Wisconsin, Madison, 1989. Complex Organization; Religion.

SPANISH AND PORTUGUESE

Chair: John R. Rosenberg
Graduate Coordinator: Christopher Lund

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THE PROGRAM OF STUDIES

Two degrees are offered through the Department of Spanish and Portuguese: Portuguese—MA and Spanish—MA. An additional MA in language acquisition (Portuguese) is offered as part of the collegewide program in language acquisition.

Most students who complete a master's degree in the department either seek jobs in secondary education or continue their studies on the PhD level. Some have located positions with government agencies or in the business sector. Each year from ten to fifteen students are admitted to the program. Although some candidates have completed their degree in as few as eighteen months, most usually require twenty-four months to meet all the requirements, and some take up to thirty-six. Students are strongly encouraged to organize their schedules so as to finish the degree in no more than two years. Limits on financial aid available through the department begin after the fifth semester in the program.

Portuguese—MA

Areas of specialization: Portuguese Language, Portuguese Literature.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 15 (U.S. and international); winter, June 30 (U.S. and international); spring, October 30 (U.S. and international); summer, December 31 (U.S. and international).

- Application requirements: as an entrance examination, applicants may be required to have an oral interview or to produce a tape demonstrating language proficiency.
- Prerequisite: baccalaureate degree in Portuguese or equivalent; minimum GPA 3.3.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (699R).
- Thesis.
- Examinations: (A) comprehensive written examination over the reading list; (B) comprehensive oral examination over the student's writing project and area of specialty.
- Complete three semesters (or equivalent) of a second foreign language other than English in addition to language of specialization.

Spanish—MA

Areas of specialization: Spanish Language, Spanish Literature, Spanish Teaching.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 15 (U.S. and international); winter, June 30 (U.S. and international); spring, October 30 (U.S. and international); summer, December 31 (U.S. and international).
- Application requirements: as an entrance examination, applicants may be required to have an oral interview or to produce a tape demonstrating language proficiency.
- Prerequisite: baccalaureate degree in Spanish or equivalent; minimum GPA 3.3.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (699R).
- Required courses: Span 601, 671, 699R; two courses outside specialization (at least one from each of the other two areas of specialization); literature and teaching specialists must take Span 620.

- Three writing options: thesis, two-paper option, or project, all written in MLA or APA style.
- Examinations: (A) comprehensive written examination over the reading list; (B) comprehensive oral examination over the student's writing project and area of specialty.
- Complete three semesters (or equivalent) of a second foreign language other than English in addition to language of specialization.

Language Acquisition (Portuguese)—MA

This program offers professional preparation to students seeking careers in applied linguistics, foreign language education, computer-assisted language learning and instruction, and other related areas. Generally not more than two students per language are admitted to the language acquisition program per year. Most students complete the degree within two years.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination is GRE general test; fifteen-minute interview in language of specialization addressing applicant's academic goals (may be completed in person, by telephone, or on tape in conversation with a second party).
- Prerequisite: baccalaureate degree and strong background in the language of specialization.

Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours (699R).
- Required courses: Ling 540, 600, 641, 660, 677.
- Departmental specialization (12): 3 hours of advanced linguistic study in language of specialization, plus 9 hours as approved by graduate committee.
- Language requirement: reading and speaking ability (202 level) in language other than English in addition to language of specialization.

- Thesis: 6 hours of 699R in language of specialization.
- Examination: oral defense of thesis.

FINANCIAL ASSISTANCE

Students may receive a position as a student instructor depending on departmental needs and on their qualifications. All potential student instructors must have completed an undergraduate 3-hour phonetics course and a 3-hour methodology course, and they must participate in an intensive workshop held during the week previous to the commencement of fall classes. Continuing employment and the number of sections assigned to candidates each semester depend on department needs and on the students' performance as instructors and on their own academic progress. Tuition scholarships are available in amounts varying from partial to full tuition.

In addition to employment as student instructors, MA candidates may occasionally find on-campus jobs as readers, teaching assistants, or research assistants.

RESOURCES AND OPPORTUNITIES

The Department of Spanish and Portuguese utilizes the **Humanities Research Center** for world-class computer-assisted language instruction and translation.

Students may choose to participate in a variety of **Study Abroad** programs conducted by the department in Europe and Latin America.

Every third year during the summer term, the College of Humanities offers the **Summer Language Institute**, a program that allows a student total immersion in a foreign language while receiving course credit. Housing is provided for participants where the language can be applied on a practical level.

Faculty research interests currently include: Caribbean sociolinguistics, pho-

netic spectography, Romance reflexives, diagnostic testing and computer-assisted language education, classical Portuguese poetry, vanguardist poetry, contemporary Hispanic theatre, Mexican prose, metafiction and metatheatre, Hispanic romanticism, seventeenth-century women playwrights, literary and scientific discourse, contemporary Spanish prose.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

Linguistics

(See Linguistics section of this catalog for courses.)

Portuguese

520. Advanced Portuguese Grammar. (3)

Applying contemporary grammatical concepts to problems in Portuguese grammar.

521. Romance Philology. (3)

Comparative study of the evolution of Latin into modern Romance languages.

522. History of the Portuguese Language. (3)

Linguistic sources that contribute to formation of Portuguese.

529R. Special Topics in Portuguese Linguistics. (3)

Topics from semantics to dialectology to sociolinguistics.

549R. Special Topics in Portuguese Literature. (3)

Prerequisite: Port 441, 451, or equivalent.

Specific topics in Portuguese (Peninsular) literature. Course content will vary each semester to offer optimum exposure to all areas of Portuguese literature.

559R. Special Topics in Brazilian Literature. (3)

Prerequisite: Port 441, 451, or equivalent.

Specific topics in Portuguese (Brazilian) literature. Course content will vary each semester to offer optimum exposure to all areas of Portuguese literature.

599R. Cooperative Education: Portuguese Internship. (1-3)

Prerequisite: Port 321 and instructor's consent.

For supervised internship credit on BYU Study Abroad programs only.

601A. Portuguese Linguistics and Research Methodology. (3)

601B. Literary Theory and Research Methodology. (3)

629R. Seminar in Portuguese Linguistics. (3)

639R. Luso-Brazilian Theatre Production. (3)

Theory and practice of dramatic performance. Includes participation in a play to be performed during semester. Total Port 639R credit toward any degree may not exceed 3 hours.

642. Camões. (3)

649R. Seminar in Portuguese Literature. (3)

652. Machado de Assis. (3)

Prerequisite: Port 441, 451, or equivalent.

653. Twentieth-Century Brazilian Literature. (3)

Prerequisite: Port 441, 451, or equivalent.

659R. Seminar in Brazilian Literature. (3)

675. Teaching Literature. (3)

Prerequisite: Port 601B

One-third of class time: theory and techniques of literature instruction; two-thirds of class time: practice teaching in undergraduate literature courses. For graduate students who plan to pursue a career in teaching literature.

680R. Directed Research in Portuguese. (1-3)

Prerequisite: written proposal subject to departmental approval.

Under direction of faculty member, designing and conducting research project that covers material not normally presented in regular course work. Research paper required. Total Port 680R credit toward any degree may not exceed 3 hours.

698R. Master's Project. (1-6)

699R. Master's Thesis. (1-9)

Spanish

520. Problems in Spanish Grammar. (3)

Application of contemporary grammatical concepts to problems in Spanish grammar.

521. Romance Philology. (3)

Comparative study of the evolution of Latin into modern Romance languages.

522. History of the Spanish Language. (3)

Linguistic sources that contributed to formation of the Spanish language.

529R. Special Topics in Spanish Linguistics. (3)

Prerequisite: Span 520, 522.

Topics could include semantics, dialectology, or sociolinguistics.

549R. Special Topics in Spanish Literature. (3)

Prerequisite: Span 441 or equivalent.

Specific topics in Spanish (peninsular) literature. Course content will vary each semester to offer optimum exposure to all areas of Spanish literature.

559R. Special Topics in

Spanish-American Literature. (3)

Prerequisite: Span 451 or equivalent.

Specific topics in Latin American literature. Course content will vary each term to offer optimum exposure to all areas of Latin American literature.

577. Spanish Language Teaching Procedures. (3)

For public school teachers. Mastery of teaching skills specific to foreign language instruction. Lectures, demonstrations, practical experience. Taught only during summer term.

599R. Cooperative Education: Spanish Internship. (1-3)

Prerequisite: Span 321 and instructor's consent.

For supervised internship credit on BYU Study Abroad programs only.

601A. Hispanic Linguistics and Research Methodology. (3)

Basic research fields in linguistics (i.e., phonology, philology, syntax, psycholinguistics), how research differs in each area, and specific theoretical issues associated with each. Bibliographical and field research methods and techniques of reporting findings.

601B. Literary Theory and Research Methodology. (3)

Introduction to literary theory, beginning with Aristotle's *Poetics* and continuing to present, but emphasizing major schools of literary theory in twentieth century. Bibliographical techniques and formats for critical essays.

601C. Research Designs in Hispanic Language Teaching. (3)

Designing and evaluating empirical research studies in foreign language learning and teaching methodology. Bibliographical techniques and methods of reporting findings.

620. Core Course in Hispanic Linguistics. (3)

Required of all MA literature and pedagogy specialists (optional for linguistics specialists who may not apply class to 30-hour requirement).

622. Hispanic Dialectology. (3)

625. Spanish Morphosyntax. (3)

Linguistic study of morphological and syntactic structure of Spanish.

626. Spanish Phonetics and Phonology. (3)

Prerequisite: Span 326 or instructor's consent.

Systematic study of articulatory and acoustic Spanish phonetics and of structural and generative approaches to phonological description of Spanish.

629R. Seminar in Spanish Linguistics. (3)

639R. Hispanic Theatre Production. (3)

Prerequisite: director's consent.

Theory and practice of dramatic performance. Includes participation in play to be performed during semester. Total Span 539R credit toward any degree may not exceed 3 hours.

640. Medieval Spanish Literature. (3)

Prerequisite: Span 441 or equivalent.

Spanish Literature from *El Cantar de Mio Cid* (1140) through *La Celestina* (1499).

643R. Golden Age Literature. (3)

Prerequisite: Span 441 or equivalent.

Sixteenth- and seventeenth-century Spanish literature.

644. *Don Quijote*. (3)

Prerequisite: Span 441 or equivalent.

In-depth study of Cervantes's *El ingenioso hidalgo don Quijote de la Mancha*.

646R. Nineteenth-Century Spanish Literature. (3)

Prerequisite: Span 441 or equivalent.

Romanticism (1770s through 1870s) and/or the novels of Benito Pérez Galdós and his contemporaries.

648R. Twentieth-Century Spanish Literature. (3)

Prerequisite: Span 441 or equivalent.

Genre (twentieth-century novel, drama, or poetry) or particular school (Generation of 1898, Generation of 1927, etc.)

649R. Seminar in Spanish Literature. (3)

650R. Pre-Columbian and Colonial Literature. (3)

Prerequisite: Span 451 or equivalent.

Indigenous literature (Maya, Nahuatl, etc.) and other texts written in Spanish colonial America through eighteenth century.

654R. The Spanish-American Novel. (3)

Prerequisite: Span 451 or equivalent.

Selected Spanish-American novelists such as Juan Rulfo, Gabriel García Márquez, Alejo Carpentier, Mario Vargas Llosa, etc.

655R. Spanish-American Poetry. (3)

Prerequisite: Span 451 or equivalent.

Selected Spanish-American poets, movements, and national traditions.

656R. Latin-American Drama. (3)

Prerequisite: Span 451 or equivalent.

Twentieth-century theatre from Spanish America and Brazil.

658R. The Hispanic-American Short Story. (3)

Prerequisite: Span 451 or equivalent.

Introduction and development of an important literary genre in Spanish America, including works of Jorge Luis Borges, Julio Cortazar, Juan Rulfo, Gabriel García Márquez, and others.

659R. Seminar in Spanish-American Literature. (3)

671. Principles of Foreign Language Learning and Teaching. (3)

Core course work for all MA candidates. Basic theories and principles of language learning and teaching. History, current research, practices, trends, and issues.

672. Media and Technology in Foreign Language Instruction. (3)

Applying modern technology and instructional media in teaching foreign languages.

673R. Directed Teaching of Spanish. (1-3)

Prerequisite: Span 326, 377, and graduate assistantship in department.

Supervised, practical experience in teaching Spanish at the college level.

674. Teaching Hispanic Culture. (3)

Methods of researching and teaching Hispanic culture.

675. Teaching Literature. (3)

Prerequisite: Span 601B

One-third of class time: theory and techniques of literature instruction; two-thirds of class time: practice teaching in undergraduate literature courses. For graduate students who plan to pursue a career in teaching literature.

676. Principles of Testing Foreign Language Skills. (3)

Test development and analysis for assessment of the four skills plus grammar and culture; survey and questionnaire construction.

678. Research Design in Foreign Language Instruction. (3)

Designing and evaluating empirical research studies in foreign language learning and teaching methodology.

679R. Seminar in Teaching Spanish. (3)

For experienced language teachers.

680R. Directed Research in Spanish. (3)

Prerequisite: written proposal subject to departmental approval.

Individualized study. Under direction of faculty member, designing and conducting research project that covers material not normally presented in regular course work. Research paper required. Total Span 680R credit toward any degree may not exceed 3 hours.

698R. Master's Project. (1-6)

Prerequisite: committee chair's consent.

Candidates in nonthesis program may complete approved field project as their writing/research experience.

699R. Master's Thesis. (1-9)

FACULTY

ALBA, ORLANDO, *Professor*. PhD, Universidad Complutense de Madrid, Spain, 1988. Hispanic Sociolinguistics.

ASHWORTH, PETER P., *Associate Professor*. PhD, University of Oklahoma, 1967. Spanish Literature.

CLEGG, J. HALVOR, *Associate Professor*. PhD, University of Texas, Austin, 1969. Phonology; Spanish Language; Linguistics.

CLUFF, RUSSELL M., *Professor*. PhD, University of Illinois, 1978. Spanish-American Literature.

DENNIS, RONALD D., *Professor*. PhD, University of Wisconsin, Madison, 1972. Brazilian Literature.

FAILS, WILLIS C., *Associate Professor*. PhD, University of Texas, Austin, 1984. Spanish and Portuguese Linguistics.

FORSTER, MERLIN H., *Professor*. PhD, University of Illinois, 1960. Spanish-American Literature.

HEGSTROM OAKLEY, VALERIE, *Assistant Professor*. PhD, University of Kansas, 1992. Classical Spanish Literature; Hispanic Theatre; Women and Literature.

JENSEN, GORDON K., *Associate Professor*. PhD, University of Wisconsin, Madison, 1975. Portuguese and Brazilian Literature.

LABRUM, MARIAN B., *Assistant Professor*. PhD, Middlebury College, 1988. Spanish-American Literature, Translation.

LARSON, JERRY W., *Professor*. PhD, University of Minnesota, Minneapolis, 1977. Spanish Language Acquisition; Methodology; Language Laboratories.

LUND, CHRISTOPHER C., *Associate Professor*. PhD, University of Texas, Austin, 1970. Classical Portuguese Literature.

LYON, THOMAS E., *Professor*. PhD, University of California, Los Angeles, 1967. Spanish-American Literature.

MATHEWS, THOMAS J., *Assistant Professor*. PhD, University of Delaware, 1992. Spanish Teaching Methodology.

MELLENDEZ, GLORIA S., *Associate Professor*. PhD, Brigham Young University, 1980. Spanish-American Literature.

MEREDITH, ROBERT ALAN, *Associate Professor*. PhD, Ohio State University, 1976. Spanish Language; Teaching Methodology.

PRATT, DALE J., *Assistant Professor*. PhD, Cornell University, 1994. Nineteenth- and Twentieth-Century Spanish Literature; Literature and Science.

QUACKENBUSH, L. HOWARD, *Professor*. PhD, University of Illinois, 1970. Spanish-American Literature.

RAMSEY, MYRIAM, *Associate Professor*. PhD, University of North Carolina, Chapel Hill, 1975. Brazilian Literature.

ROSENBERG, JOHN R., *Associate Professor*. PhD, Cornell University, 1985. Nineteenth- and Twentieth-Century Spanish Literature

TURLEY, JEFFREY S., *Assistant Professor*. PhD, University of California, Berkeley, 1992. Spanish Linguistics and Medieval Literature.

STATISTICS

Chair: Gale Rex Bryce
Graduate Coordinator: Bruce J. Collings

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THE PROGRAM OF STUDIES

Statistics is a scientific discipline by which statisticians assist other scientists and researchers in making *informed* decisions in the face of uncertainty. Statisticians use skills—not only in statistics, but in other disciplines such as mathematics, computer science, business, management, and engineering—to solve problems. *The application of statistics is the embodiment of the scientific method.*

The graduate curriculum is designed to equip students with decision-making skills necessary for successful careers as professional statisticians. Although a firm foundation in theoretical statistics is provided, most of the courses are applied in nature, offering approaches to the solution of important real-world problems.

One degree is offered through the Department of Statistics: Statistics—MS. A statistics minor is also offered.

About twenty to twenty-five students are currently enrolled in the master's program in statistics. Students with an undergraduate degree in statistics, or with a very strong mathematics background, can generally complete the master's program in a little over one year. Other students generally take two years to complete the program.

Statistics—MS

This program is designed to prepare students for work in industry and government or PhD work in statistics.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 1 (U.S. and international). Students with a BS degree in statistics enter fall semester; others enter spring or summer. Contact the department for further information.
- Entrance examination: GRE general test; minimum 3.3 overall undergraduate GPA required. Every international applicant whose native language is not English is required to submit TOEFL scores (minimum 580).
- Prerequisite: Stat 322, 341, 342, 411; 337 or 501; Math 343, 344; CS 130; or equivalents to these. Students whose native language is not English may be required to take one or more ESL classes, depending on the outcome of an interview with the department.

Requirements for Degree.

- Credit hours (31): minimum 25 course work hours plus 6 thesis course (Stat 699R).
- Required courses: Stat 520, 521, 522, 531, 536, 591R, 592, 611, 636; one course from Stat 534, 537, 541, 545, 563, 621, 631, 662, 690R, Math 315 or other approved course.
- Minor (optional): any approved minor.
- Thesis.
- Examinations: (A) methods qualifying examination (Stat 222, 322, 336, 337; or 322, 501, 502) and theory qualifying examination (Stat 322, 341, 342, 520); (B) oral examination on course work; (C) oral defense of thesis.

Statistics—Minor

The statistics minor is offered to strengthen the data analysis skills of graduate students in the various experimental areas where statistical methodologies are frequently applied.

Master's Level.

- 9 hours in statistics courses numbered 311 or above except 552 and 554 (maximum 3 hours of 300–400 level may apply toward a graduate minor).

- Methods qualifying examination (Stat 222, 322, 336, 337; or 322, 501, 502) or the theory qualifying examination (Stat 322, 341, 342, 520).

PhD Level.

- Stat 520, 521.
- 9 additional hours from statistics courses 500 and above except Stat 501, 552, 554.
- Methods qualifying examination (Stat 222, 322, 336, 337; or 322, 501, 502) and a theory qualifying examination (Stat 322, 341, 342, 520).

FINANCIAL ASSISTANCE

The department has limited funds to supplement students' financial needs, and such funds are only available within departmental and university guidelines. Assistance is available in the following forms: tuition awards, internships, research assistantships, and tuition scholarships. For those interested in pursuing research assistantships, a booklet describing current research proposals is available in the department library.

RESOURCES AND OPPORTUNITIES

Center for Statistical Research. The center operates with full access to all departmental resources to provide statistical expertise to faculty, graduate students, and off-campus researchers in other disciplines. Areas of particular strength are designing experiments and sample surveys and analyzing the resulting data. Problems are solved by application and adaptation of state-of-the-art methodology and development of new methodology as required.

Quality Science Laboratory. The role of the Quality Science Laboratory is to facilitate the study and development of tools and techniques for improving the quality of products and services in the industrial, service, and government sectors. The Department of Statistics has administrative responsibility for the laboratory, but it is used by students from various parts of campus for study in quality technologies

as well as to further research in the technology of quality control and improvement. Through the support of various industries, the laboratory is furnished with the latest computer equipment and automated measurement equipment for the collection and evaluation of quality-related data.

Computing Facilities. The Department of Statistics provides several excellent general computer laboratories furnished with modern computing equipment and software suitable for word processing, statistical graphics, data analysis, and statistical computing. These laboratories are reserved for the use of students in the department.

The current research plan for the Department of Statistics as a whole includes the development of multi-source data methods and the development of statistical tools for total quality management. In addition to these two general interests, specific research interest for individual faculty are listed in the faculty section immediately following the course descriptions.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

501. Statistics for Research Workers 1. (5)

Prerequisite: Math 110 or equivalent. Recommended: concurrent registration in Stat 211, 322.

Probability, estimation, tests of hypotheses, regression, analysis of variance, and nonparametric methods. For natural or social science students.

502. Statistics for Research Workers 2. (5)

Prerequisite: Stat 501 or equivalent.

Analysis of covariance, multiple regression, linear models, design of experiments, and sampling. For natural or social science students.

520. Statistical Theory 1. (3)

Prerequisite: Math 344, Stat 341, 342, and instructor's consent.

Axiomatic probability theory for discrete and continuous random variables; moment generating functions; conditional probability; stochastic independence; transformations; limiting distributions; stochastic convergence, central limit theorem.

521. Statistical Theory 2. (3)

Prerequisite: Stat 520.

Sufficiency and completeness; point and interval estimation; hypothesis testing; Cramer-Rao inequality; some asymptotic results; introduction to Bayesian methods.

522. Theory of Linear Models. (3)

Prerequisite: Stat 322, 520, Math 343.

Linear hypotheses, with application to regression and design.

531. Experimental Design. (3)

Prerequisite: Stat 337.

Power for basic designs, hierarchical designs, change-over designs, confounding in symmetric and asymmetric designs, incomplete block designs, bioassay and response surface designs.

532. Quality Improvement for Engineering. (3)

Prerequisite: Stat 361, Math 113.

Selected topics in statistical theory, analysis of variance, simple and multiple regression, response surface design and analysis, multilevel experimental designs, blocking designs, confounding.

534. Sampling. (3)

Prerequisite: Stat 334; Stat 341 or instructor's consent.

Estimation in systematic, simple random, stratified, cluster, and PPS sampling and mixtures of these; ratio estimation; sample size determination and principles of sample allocation.

536. Regression Analysis. (3)

Prerequisite: Stat 322; 336 or 501.

Multiple regression, introduction to model building and nonlinear estimation, examination of residuals, stepwise regression, subset selection procedures, biased estimation, and model validation.

537. Categorical Data Analysis. (3)

Prerequisite: Stat 337 or 502; 536.

Analysis of multiway contingency tables with linear and log-linear models using maximum likelihood and minimum modified chi-square estimates as appropriate.

541. Advanced Probability. (3)

Prerequisite: Stat 520 or instructor's consent.

Stochastic processes, Markov chains, generating functions, birth-death processes, random walks, the gambler's ruin problem, advanced combinatorial methods.

545. Stochastic Processes. (3)

Prerequisite: Stat 421 or 520.

Review of elementary probability: expectation, characteristic functions, limit theorems. Introductory random processes: definitions and properties, covariance and spectral density, time average, stationarity, ergodicity, linear system relations, mean square estimation, Markov processes.

552. Statistical Methods in Education 1. (3)

Prerequisite: Math 100 or equivalent.

Measures of central tendency, variability; correlation; simple linear regression; introduction to hypothesis testing and estimation. Computer applications. For graduate majors in education and related fields.

554. Statistical Methods in Education 2. (3)

Prerequisite: Stat 552.

Applications of analysis of variance and covariance, multiple regression, correlation, and nonparametric methods. Introduction to experimental design. For graduate majors in education and related fields.

563. Advanced Operations

Research. (3)

Prerequisite: Stat 463, 520.

Stochastic simulations; integer, non-linear, and stochastic programming; developments in inventory theory; Markovian decision processes; insurance risks.

591R. Graduate Seminar in

Statistics. (0)

592. Statistical Consulting. (1)

599R. Cooperative Education:

Statistics. (1-9)

Prerequisite: departmental consent.

On-the-job experience. Report required.

611. Multivariate Statistical

Methods. (3)

Prerequisite: Stat 322; 337 or 502.

Inference about mean vectors and covariance matrices; multivariate analysis of variance and regression; canonical correlation; discriminant analysis; principal component analysis; factor analysis.

621. Advanced Theory of

Statistics. (3)

Prerequisite: Math 344, Stat 521.

Theory of estimation, testing hypotheses, multiple regression, and multivariate analysis.

631. Advanced Experimental

Design. (3)

Prerequisite: Stat 342, 531.

Response surface methods, optimal designs, mixture designs, designs for nonlinear models, multi-response experiments, robust designs.

636. Advanced Statistical

Methods. (3)

Prerequisite: Stat 342, 322; 502 or 531; 536.

Analysis of variance with unequal subclass frequencies, including missing cells; analysis of covariance; orthogonal polynomials; multiple comparisons and related topics.

662. Advanced Industrial Statistics

and Reliability. (3)

Prerequisite: Stat 342, 462; Math 344.

Sequential sampling, tolerance limits, life testing, and reliability.

690R. Advanced Special Topics. (3)

Prerequisite: instructor's consent.

695R. Readings in Statistics. (1-3)

Prerequisite: departmental consent.

699R. Master's Thesis. (1-6)

Prerequisite: departmental consent.

FACULTY

BEUS, GARY B., *Associate Professor.*

PhD, Virginia Polytechnic Institute, 1968. Statistical Education; Quality Control.

BRYCE, GALE REX, *Professor. PhD,*

University of Kentucky, 1974. Industrial Quality Improvement.

CHRISTENSEN, HOWARD B., *Professor.*

PhD, North Carolina State University, 1975. Nonparametrics; Sample Design.

COLLINGS, BRUCE J., *Professor. PhD,*

University of North Carolina, 1981. Actuarial Science; Biostatistics; Combinatorics.

FELLINGHAM, GILBERT W., *Assistant*

Professor. PhD, University of Washington, 1990. Biostatistics; Combining Data; Missing and Marginal Data.

GRIMSHAW, SCOTT D., *Assistant*

Professor. PhD, Texas A&M University, 1989. Statistical Computing; Industrial Quality Improvement; Modern Regression Methods.

HENDRIX, LELAND J., *Professor. PhD,*

Brigham Young University, 1967. Experimental Design; Computer Applications.

HILTON, H. GILL, *Professor. PhD, North*

Carolina State University, 1962. Experimental Design.

LAWSON, JOHN S., *Associate Professor.*

PhD, Polytechnic Institute of New York, 1984. Industrial Statistics; Experimental Design.

MADRIGAL, J. L., *Associate Professor.*

DPhil, Oxford, England, 1985.

Strategic Decision Making; Industrial and Business Statistics; Biostatistics.

RENCER, ALVIN C., *Professor. PhD,*

Virginia Polytechnic Institute, 1968. Multivariate Analysis; Linear Models.

SCHAAALJE, G. BRUCE, *Assistant*

Professor. PhD, North Carolina State University, 1988. Design and Analysis of Experiments; Population Modeling; Application of Statistics in Biology and Agriculture.

SCOTT, DEL T., *Professor. PhD,*

Pennsylvania State University, 1977. Statistical Computing; Categorical Data Analysis; Linear Models.

TOLLEY, H. DENNIS, *Professor. PhD,*

University of North Carolina, 1974. Health and Actuarial Statistics.

TECHNOLOGY EDUCATION AND CONSTRUCTION MANAGEMENT

Chair: Garth A. Hill

Graduate Coordinator: Jerry Grover

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THE PROGRAM OF STUDIES

One degree is offered through the Department of Technology Education and Construction Management: Technology Education—MS. The master of science program is designed to develop writing and research skills relating to technology education and management through either the project or the thesis option. The project option concentrates on more theory and a field-based study, whereas the thesis is research oriented. It is the goal of the department to instill in students professional ethics and intellectual curiosity.

Either program will prepare vocational/technical or management students to be more effective leaders by providing the necessary opportunity for achieving the knowledge and skills for leadership in teaching, supervising, and managing in schools or industry.

The average number of students in the program is twenty-four. The standard duration of the degree is one full calendar year or four summer terms.

Technology Education—MS

The MS degree programs in technology education provide two options for completing graduation requirements. The student may elect the summer residency program or the full-time, on-campus program. The summer residency program consists of a minimum three to four full-time summers on campus, with interven-

ing approved field experiences during fall and winter semesters.

Admission and Entry.

Semesters of entry and application deadlines: fall, winter, spring, summer, February 15 (U.S. and international).

Requirements for Degree—Project Option.

- Prerequisite: valid teaching certificate or minimum 30 semester hours in acceptable technology or vocational education courses.
- Credit hours: minimum 34 hours, including field project (TecE 698R).
- Required courses:
History and Philosophy: TecE 610 or 615; 690.
Curriculum: TecE 625, 645; IS 560 or 620.
Research: IS 672 or ELdr 671 or EIEd 672; TecE 694R, 698R.
- Electives: at least 8 in technology education; remaining hours may be from business, construction management, educational leadership, counseling, secondary curriculum, or technical depth.
- Project.
- Examination: written and oral defense of course work.

Requirements for Degree—Thesis Option.

- Prerequisite: 30 hours of acceptable undergraduate technology or vocational education courses, or a minimum six years of vocational experience.
- Credit hours (34): minimum 28 course work hours plus 6 thesis hours (TecE 699R).
- Required courses:
History and Philosophy: TecE 610 or 615; 690.
Curriculum: TecE 625, 645.
Management: TecE 535, 640; IS 560 or 620.
Research: TecE 694R, 699R; IS 672 or ELdr 671 or EIEd 672; Stat 501 or 552.
- Electives: at least 6 hours in technology education. Remaining hours may be from business, construction management, educational leadership, educational psychology, counseling,

technical depth, or as approved by committee.

- Thesis.
- Examination: oral defense of course work and thesis.

FINANCIAL ASSISTANCE

The department offers research and teaching assistantships during the academic year to graduate students. During summer term, a part-tuition scholarship is available for qualified graduate students.

Applications for awards may be obtained from the department and returned at least by the beginning of the semester.

RESOURCES AND OPPORTUNITIES

Nationally recognized instructional laboratories are available to provide students with the most current concepts, curriculum, software, equipment, and laboratory instructional/physical organization.

COURSE DESCRIPTIONS

505. Technology for the Elementary School. (2)

Basic concepts and activities needed to prepare elementary students to cope with their technological society.

535. Industrial/Vocational Safety Program Development. (2)

Identifying and implementing programs for safety and facilities management that comply with state and national legislation.

593R. Workshop in Industrial/Technology Education. (1-3)

Reviewing and participating in current industrial and technological advances. Limited to 3 credit hours maximum.

610. History and Legislation of Vocational and Technology Programs. (2)

Historical basis of today's vocational/technological programs with emphasis on past and current funding.

615. Philosophical Basis of Technological Programs. (2)

Rationale for vocational and technology programs, including current and future trends and social, economic, and environmental impacts.

625. Instructional Management for Vocational and Technology Courses. (2)

Identifying, developing, and implementing instructional strategies unique to vocational-technical programs.

630. Adult Vocational and Technology Programs. (2)

Identifying, developing, and implementing relevant applied technology training programs.

635. Facility Design for Vocational and Technology Programs. (2)

Developing instructional facilities and educational specifications for vocational and technology laboratories.

640. Coordination and Supervision of Vocational and Technology Programs. (2)

Methods, regulations, and policies used in supervising vocational and technical education programs.

645. Visual and Graphic Presentations in Vocational and Technology Programs. (2)

Identifying, developing, and using visual and graphic material for vocational and technology programs.

690R. Seminar. (1)

Review of latest research and developments in technology and vocational education.

694R. Readings and Conference. (1-3)

Limited to a maximum of 3 credit hours.

695R. Advanced Technological Processes. (1-3)

Developing and implementing solutions to special problems; advanced skills/concepts in traditional and emerging technology areas.

698R. Master's Project. (1-3)

699R. Master's Thesis. (1-6)

FACULTY

BASHFORD, HOWARD H., *Associate Professor.* PhD, Brigham Young University, 1984. Construction.

CHRISTENSEN, KIP W., *Associate Professor.* PhD, Colorado State University, 1991. Construction; Woods; Teacher Education.

GONZALES, RONALD F., *Associate Professor.* PhD, Purdue University, 1982. Automotive Technology; Electronics; Teacher Education.

GROVER, JERRY V. *Professor.* EdD, Brigham Young University, 1968. Automotive Technology; Student Teaching.

HILL, GARTH A., *Associate Professor.* PhD, Colorado State University, 1979. Metals; Teacher Education.

MARTIN, LOREN, *Associate Professor.* EdD, Utah State University, 1973. Construction; Teacher Education.

NEWITT, JAY S., *Associate Professor.* PhD, Colorado State University, 1980. Construction.

ROGERS, LEON, *Associate Professor.* PhD, Texas A&M, 1988. Estimating.

THEATRE AND FILM

Chair: Eric Fielding

Graduate Coordinator: Bob Nelson

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(801) 378-3406

THE PROGRAM OF STUDIES

The Department of Theatre and Film supports the university's synthesis of religious, humanistic, artistic, and professional education. The department serves people who love theatre and film and believe in the value of the arts in education.

Recognizing the need to enrich people's lives through theatre and film, the Department of Theatre and Film seeks excellence in the study and practice of these arts by stressing rigorous scholarship, high artistic standards, and Christian behavior. The department (1) educates broadly in the best liberal arts tradition; (2) develops disciplined scholars, artists, and educators; and (3) prepares articulate, thinking, caring individuals who will effectively serve their professions, their communities, and their church.

We believe in the power of the arts and in the capacity of theatre and film to enlighten, humanize, civilize, and edify. The desire of human beings through the ages to create art and to pursue beauty for its own sake becomes, in the light of the gospel, powerful evidence of people's divine nature and parentage. Such a spiritual assurance of the eternal validity and importance of the arts brings, in turn, greater meaning and satisfaction to the study of theatre and film at BYU.

Three degrees are offered through the Department of Theatre and Film: Theatre and Film—MA, Theatre Design and Technology—MFA, and Theatre and Film—PhD. However, as part of the continuing effort to strengthen our entire academic

program, students will not be admitted into the Theatre Design and Technology—MFA and Theatre and Film—PhD programs until fall 1998.

Theatre and Film—MA

Areas of emphasis: Theatre or Film History, Theory, Criticism; Theatre for Young Audiences.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international); summer, December 31 (international) and February 1 (U.S.).
- Application requirements: entrance examination is GRE general test (scores subject to review); samples of written work demonstrating capacity to function at acceptable graduate student entry level.
- Prerequisite: acceptable undergraduate background in theatre arts or film.

Requirements for Degree.

- Credit hours (32): minimum 26 course work hours plus 6 thesis hours (ThF 699R) (minimum 20 hours must be in theatre/film or theatre/film-related courses).
- Required courses: ThF 690; 9 hours in graduate-level history, theory, and criticism—either 3 hours in film and 6 in theatre, or 6 hours in film and 3 in theatre, depending upon area of emphasis.
- Minor (optional): any approved minor.
- Production: at least one significant production experience, determined in consultation with advisory committee (evaluation will occur immediately after the production).
- Thesis: thesis must make a genuine contribution to body of knowledge and meet highest academic standards (departmental style guides are MLA and Turabian). Three kinds of thesis research will be accepted: (A) scholarly analysis of theatre, film, or television/new media history, theory, or criticism; (B) research and strong creative achievement in theatre or film; (C) measurement studies.

- Examinations: (A) comprehensive written examination; (B) comprehensive oral examination; (C) oral defense of thesis.

Theatre Design and Technology—MFA

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination is GRE general test; résumé and portfolio; samples of written work demonstrating capacity to function at acceptable graduate student entry level; interview with area committee.
- Prerequisite: ThF 116, 117, 121, 123, 127R, 140, 141R, 143R, 200, 201, 220, 361, 461; Art 108, 422, 433R; CITx 145, 245, 345; or equivalents.

Requirements for Degree.

- Credit hours: minimum 60 course work hours, including 6 project hours (ThF 698R).
- Required courses: ThF 520, 544R, 595R, 599R, 600, 601, 662R, 668, 674R, 690, 698R, 731, 732, 797R.
- Electives (15 hours selected from the following in consultation with advisory committee): ThF 519, 541R, 542R, 544R, 545R, 562, 670, 678, 697R; Art 600R, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610; CITx 545.
- Off-campus internship (ThF 599R).
- Project (minimum 6 hours; ThF 698R): design and supervision of scenery, lighting, or costumes for at least one full-length production (must be reported in thesis form and accepted by area committee).
- Examinations: (A) comprehensive written examination; (B) comprehensive oral examination; (C) oral defense of project.

Theatre and Film—PhD

Areas of emphasis: Theatre or Film History, Theory, Criticism; Theatre for Young Audiences.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and

international); summer, December 31 (international) and February 1 (U.S.).

- Application requirements: entrance examination is GRE general test (scores subject to review); samples of written work demonstrating capacity to function at acceptable doctoral student entry level.
- Prerequisite: acceptable master's degree in theatre or film.

Requirements for Degree.

- Credit hours beyond bachelor's degree (78): minimum 45 hours in theatre and film; 15 hours in approved minor; 18 dissertation hours (ThF 799R).
- Required courses: ThF 690; 18 hours in graduate-level history, theory, and criticism—either 6 hours in film and 12 in theatre, or 12 hours in film and 6 in theatre, depending upon area of emphasis.
- Language/Skill requirement: select one of three options:
Option 1. One Language, in Depth (Reading/Speaking Ability): specific language to be determined in consultation with graduate committee. Demonstrate competency through completion (grade B or better) of 300-level literature and culture course, taught in the language, or equivalent. Or, demonstrate competency by means of special examination, in consultation with graduate committee, that will test ability to translate literature in field competently and communicate orally in the language.
Option 2. Two Languages (Reading Ability): specific languages to be determined in consultation with graduate committee. Demonstrate competency through passing of two-semester intensive reading course in the languages, or equivalent.
Option 3. One Language (Reading Ability) and One Skill Subject: specific language and skill subject—which must be outside the department—to be determined in consultation with graduate committee. Demonstrate competency in language through passing two-semester intensive reading course in the language, or equivalent. Demonstrate competency

in skill subject through completion (grade B or better) of 9 semester hours of graduate-level course work, as approved by graduate committee.

- **Production:** at least one significant production experience, as determined in consultation with advisory committee (evaluation will occur immediately after the production).
- **Dissertation:** dissertation must make a genuine contribution to body of knowledge and meet highest academic standards (departmental style guides are MLA and Turabian). Three kinds of dissertation research will be accepted: (A) scholarly analysis of theatre, film, or television/new media history, theory, or criticism; (B) research and strong creative achievement in theatre or film; (C) measurement studies.
- **Examinations:** (A) comprehensive written examination; (B) comprehensive oral examination; (C) oral defense of dissertation.

FINANCIAL ASSISTANCE

The following financial support is available through the Department of Theatre and Film:

Assistantships. Graduate students work in the following areas—costume shop, lighting, musical theatre (accompanist, movement), properties, publicity, research, stage management, teaching (assistantships for ThF 115, 116, 117, 123, 124, 200/201, 361/461), and theatre for young audiences.

Candidates must have appropriate background and experience to be considered. Assistantships range from quarter-time to half-time; pay is based on applicant's experience, year in school, and the type of assistantship.

Internships. The department generally offers a quarter-time internship during fall and winter semesters and spring and summer terms. Internships range from \$660 to \$1,350 per semester.

Supplemental Tuition Awards. A number of supplemental tuition awards are offered by the department during all semesters and terms. The size of these awards is determined by the applicants' qualifications and the availability of departmental funds.

RESOURCES AND OPPORTUNITIES

The Harris Fine Arts Center houses the Department of Theatre and Film, five speech and drama theatres; two concert halls; and practice rooms for music, dance, and theatre.

Theatres. Three major theatres in the Harris Fine Arts Center serve as laboratories for graduate students in acting, directing, and technical theatre.

Concert and Recital Halls. Graduate students have opportunities to perform individually and with groups in both the Madsen Recital Hall and the de Jong Concert Hall in the Harris Fine Arts Center.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

516R. Theatre and Film

Instruction. (1–3)

Prerequisite: instructor's consent.

Master class for developing teaching methods and techniques.

519R. Stage Management 2. (1–3)

Prerequisite: ThF 319 or equivalent.

Advanced principles, techniques, and practice. Production stage managers chosen from this course.

520. Scenic Design 2. (3)

Prerequisite: ThF 140, 220, or instructor's consent.

Intermediate theory and practice of scenic design for the stage.

522R. Auditions and the Business. (3)

Prerequisite: ThF 124R, 323R, 324R.

Auditions, cold reading, resumés, and the business end of acting, music, and dance for the professional performer.

523R. Acting: Recital. (2)

Prerequisite: ThF 124R, 323R, 324R.

Twenty-five- to thirty-minute performance of cuttings from varied genres.

524R. Acting: Advanced Performance. (3)

Prerequisite: ThF 124R, 323R, 324R.

Performance option: performance and written analysis of approved role in a major production. Teaching option: assistance in acting classes and weekly seminar.

526. Sound Design 2. (2)

Prerequisite: ThF 220, 326, or equivalent.

Theory, practice, and methodology of studio sound recording, reinforcement, and mixing.

527. Storytelling. (2)

Theory, technique, and practice.

540R. Workshop 2: Acting. (1–6)

Prerequisite: instructor's consent.

Advanced experience in production: acting.

541. Set Construction 3. (3)

Advanced experience in production: construction.

542R. Theatre Production 3. (1–3)

Prerequisite: 143R, 343R, or equivalent.

Advanced experience in production: technical crew.

543R. Workshop 2: Directing. (1–6)

Prerequisite: instructor's consent.

Advanced experience in production: directing.

544R. Workshop: Design. (1–6)

Prerequisite: instructor's consent.

Advanced experience in production: design.

545R. Costume Construction 3. (1–6)
Prerequisite: ThF 543R, 544R, or instructor's consent.

Special construction: armor, masks, etc.

552R. Creative Dramatics and Improvisation. (3)

Informal or improvised dramatic techniques with children, adolescents, and/or adults.

562. Costume Design 3. (3)

Prerequisite: ThF 220, 362, 462, 544R, 595R, or instructor's consent.

Advanced theory and practice in costume design for stage and screen.

572R. Theatre for Children. (2)

Theories, techniques, and experience in creating formal drama for the child and youth audience.

578R. Advanced Playwriting. (2–6)

Prerequisite: ThF 378R.

Seminar in playwriting.

579R. Playwright's, Director's, Actor's Workshop. (4)

Prerequisite: by audition only.

Group approach to nurturing new work through script study, improvisation, and staged readings.

581. Art Direction. (3)

Prerequisite: ThF 280 or equivalent; instructor's consent.

Fundamentals of motion picture/television art direction and design.

584. Film Sound. (3)

Prerequisite: ThF 280R or equivalent; instructor's consent.

Motion picture sound recording and theory.

585. Screenwriting 3. (3)

Prerequisite: ThF 380, 485, or equivalent; full acceptance into film BFA program.

Theory and technique of writing feature-length dramatic screenplays.

587R. Film Genres. (3)

Prerequisite: ThF 202, 203, 489R, and full acceptance into film BA or BFA program.

Intensive study of major film genres: western, musical, or horror.

588R. Motion Picture Directors. (3)

Prerequisite: ThF 202, 203.

In-depth study of representative body of motion pictures by one major film director such as John Ford, Howard Hawks, Ingmar Bergman, or Woody Allen.

595R. Workshop 2: Special Projects. (1–6)

Advanced experience in production: special projects.

599R. Cooperative Education. (1–9)

Prerequisite: instructor's consent.

Off-campus experience in stage, film, or television writing, directing, acting, designing, or managing.

600. Advanced History 1: Theatre. (3)

Prerequisite: ThF 200, 201.

Primitive, classical, medieval, and Renaissance theatre through seventeenth century.

601. Advanced History 2: Theatre. (3)

Prerequisite: ThF 200, 201.

Theatre, eighteenth century to present.

644. Advanced Scenic Design. (3)

Prerequisite: ThF 140, 220, 340R, 520, or equivalent.

Advanced theory and practice in set design for stage.

660R. Advanced Voice and Interpretation. (3)

Prerequisite: ThF 121, 122, 123, 325R.

Continuation of ThF 325R. Polish-ing vocal and interpretative skills through performances.

662R. Seminar in the Theory and History of Theatrical Costuming. (3)

Prerequisite: ThF 220, 295R, 362, 544R, 562, 595R, or equivalent.

Major movements and evolution of costuming theory, providing research and design experience.

664. Theatre Management 1. (2)

Theory and practice, including play selection, budget, and promotion.

665. Theatre Management 2. (2)

Theory and practice, including box office, theatre plant, and personnel.

668R. Special Studies in Theatre, Film, or Television. (1–3)

Supervised research in selected historical, theoretical, or critical problems.

670. Advanced Set Construction. (3)

Prerequisite: ThF 140, 340, 541, or equivalent.

Special problems in scenery construction and rigging.

671R. Advanced Directing. (3)

Prerequisite: ThF 200, 201, 361, 461, or equivalent.

Theories and techniques of directing for the stage through directing projects for public presentation.

674R. Projects in Theatre and Film. (1–4)

Supervised applied theory in playwriting/screenwriting, directing, acting, design, criticism, stagecraft.

678. Advanced Stage Lighting. (3)

Prerequisite: ThF 142, 220, 321, or equivalent.

Theory and techniques of theatrical lighting.

680R. Advanced Film Production. (5)

Prerequisite: ThF 280, 285, 380, 485, 490, or equivalent; instructor's consent.

Advanced 16-mm filmmaking.

685R. Screenwriting 4. (3)

Prerequisite: ThF 490, 585, and instructor's consent.

Advanced practical experience in screenwriting.

689. Motion Picture History. (3)

Worldwide survey of advanced motion picture history.

690. Introduction to Graduate Studies in Theatre and Film. (3)

Introductory seminar required of all graduate students during first semester or term that class is offered.

697R. Seminar and Production: Special Theatre Forms. (2-3)

Prerequisite: instructor's consent.

Theory and practice directing in special forms: readers theatre, avant-garde, etc.

698R. Master's Project. (1-6)

699R. Master's Thesis. (1-9)

700R. Master Seminar. (3)

Selected topics.

731. Dramatic Theory and Criticism 1. (3)

Development from beginning to nineteenth century.

732. Dramatic Theory and Criticism 2. (3)

Development from nineteenth century to present.

772R. Seminar in Child Drama. (3)

Prerequisite: ThF 552R, 572R, or instructor's consent.

Advanced theory and research in drama and theatre with and for children.

788R. Symposium for Filmmakers. (3)

Prerequisite: ThF 280, 490; 680R or concurrent registration; instructor's consent.

Symposium to stimulate and enhance perception and understanding of motion picture industry and its historical, contemporary, and social context.

797R. Research. (Arr.)

799R. Doctoral Dissertation. (1-18)

FACULTY

BENTLEY, MARION J., *Professor. PhD,* University of Utah, 1968. Directing; Acting; Dialects; Theatre History.

FIELDING, ERIC, *Professor. MFA,* Goodman School of Drama, Art Institute of Chicago, 1976. Set Design; Lighting Design; Theatre Management.

HEINER, BARTA, *Associate Professor. MFA,* American Conservatory Theatre, 1977. Acting; Directing.

MORGAN, DAVID E., *Assistant Professor. MFA,* National Theatre Conservatory, 1990. Acting; Directing.

NELSON, GEORGE D., *Associate Professor. MFA,* University of Washington, 1979. Secondary Education; Child Drama.

NELSON, BOB, *Associate Professor. PhD,* University of Utah, 1976. Acting; Directing; Theatre History; Dramatic Theory and Criticism.

OAKS, HAROLD R., *Professor. PhD,* University of Minnesota, Minneapolis, 1964. Child Drama; Children's Theatre; Puppetry; Directing.

SAMUELSEN, ERIC, *Assistant Professor. PhD,* Indiana University, 1991. History; Theory; Criticism.

SCANLON, RORY R., *Associate Professor. MFA,* University of Illinois, 1984. Set and Costume Design; Costume History; Lighting Design.

SLOVER, TIM, *Assistant Professor. PhD,* University of Michigan, 1993. Playwriting; Screenwriting.

SWENSON, JANET L., *Associate Professor. MFA,* University of Utah, 1992. Costume Design; Costume History; Makeup.

SWENSON, SHARON, *Assistant Professor. PhD,* University of Utah, 1993. Film History; Theory; Criticism.

WALKER, OSCAR LEE, *Assistant Professor. MIE,* Brigham Young University, 1975. Technical Theatre; Stage Management.

VISUAL ARTS

Chair: Michael Day

Graduate Coordinators:

Art Education: Donna Kay Beattie

Art History: Steven Bule

MFA Programs: Von Allen

B-509 HFAC

PO Box 26402

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THE PROGRAM OF STUDIES

Three postgraduate degrees are offered in the Department of Visual Arts: Art Education—MA, Art History—MA, and Art Studio—MFA. Each requires practicing the component disciplines of art, as well as acquiring certain skills, knowledge, and understandings.

These three strong graduate programs examine and promote the study, creation, and teaching of the visual arts, historically and from contemporary perspectives. Faculty in each area are recognized leading practitioners as well as students of the theoretical, philosophical, and professional issues of their respective academic specialties. The academic thrust of graduate studies in the Department of Visual Arts provides a rich blend of the theoretical and the practical for a balanced understanding of art. High standards for study and practice in each degree program promote the high levels of professional practice and accomplishment expected of and achieved by our graduates.

The average number of students in each program and the duration of each program is as follows:

- Art Education: 17 students in program; from four to five years to completion for part-time students and two years to completion for full-time students.
- Art History: 14 students in program; three years to completion.
- Art Studio: 18 students in program; three years to completion.

Art Education—MA

The MA in art education offers two options. Option A requires a research-oriented thesis; it is intended for individuals who plan to pursue a PhD or an EdD in art education. Option B requires a practical curriculum project; it is designed for individuals who teach and make art. Both options require 36 credit hours.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: slide portfolio of applicant's recent work; one or two written papers demonstrating applicant's writing skills; minimum 3.0 GPA for last 60 hours.
- Prerequisite: baccalaureate degree in art education from an accredited institution (applicants holding other teaching degrees may be considered if art deficiencies are completed to the satisfaction of the Art Education Admissions Committee); certification to teach in public schools at the elementary or secondary level; minimum two years of teaching experience.

Requirements for Degree.

- Credit hours: minimum 32 hours for Option A; 36 hours for Option B. For both options: minimum 26–32 course work hours primarily from 500- and 600-level courses (no more than 9 hours of 300- or 400-level courses may apply), plus 6 thesis or 4 project hours (Art 699R or 698R).
- Course requirements for *Option A*: 15 hours of core art education seminar, 5 hours of education research and writing, and 6 elective hours (may include approved courses taken outside the department).
- Course requirements for *Option B*: 15 hours of core art education seminar, 9 hours divided among art studio and art history courses, 6 elective hours (may include approved courses taken outside the department), and 2 hours of educational writing.
- Acceptance by department of thesis or curriculum project proposal.

- Thesis or curriculum project: Option A, thesis, 6 hours; Option B, project, 4 hours.
- Select graduate committee during first semester and submit study list.
- Examinations: (A) written comprehensive examination during final semester of residency; (B) oral defense of thesis or project.

Art History—MA

The MA in art history is designed to prepare students for advanced graduate study and to provide a foundation for students desiring a career in a museum or art gallery or in art restoration and conservation.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international); winter, September 1 (U.S. and international).
- Application requirements: minimum 3.3 GPA for last 60 hours.
- Prerequisite: baccalaureate degree in art history or related field.

Requirements for Degree.

- Credit hours:
Thesis Option (30 hours): minimum 24 course work hours plus 6 thesis hours (Art 699R).
Two-Paper Option (33 hours): minimum 27 course work hours plus 6 hours of Art 698R.
- Required courses: Art 300 and courses selected in consultation with the graduate coordinator and graduate committee chair (the MA program is designed to allow maximum exposure to the various areas of art history).
- Language requirement: reading knowledge of at least one foreign language, preferably French, German, or Italian; similar competence recommended in a second language.
- Thesis or two extended papers.
- Select graduate committee during first semester and submit study list.
- Examinations: (A) final written comprehensive examination; (B) oral defense of thesis.

Art Studio—MFA

The MFA in art studio is committed to preparing students for careers as visual artists. The MFA has four areas of specialization: Ceramics, Painting—Drawing, Printmaking—Drawing, and Sculpture. Each area requires 60 credit hours, which includes 6 hours of project.

Admission and Entry.

- Semester of entry and application deadline: fall, February 1 (U.S. and international) **Note:** The number of resident MFA candidates is restricted by availability of individual studio space.
- Application requirements: minimum 3.0 GPA for last 60 hours; complete university and department graduate application forms; and a twenty-slide portfolio of applicant's work.
- Prerequisite: baccalaureate degree in art or equivalent with minimum 20 hours of upper-division course work and 12 hours of art history. (Applicants with MA degree in art from another institution may request departmental approval to transfer graduate credit.)

Requirements for Degree.

- Credit hours (60): minimum 60 hours of approved course work, including 6 hours of project (VASTu 697R).
- Course requirements: 30 hours in area of specialization (Ceramics, Painting—Drawing, Printmaking—Drawing, or Sculpture); 9 hours in support area (may exceed departmental boundaries if approved by graduate committee; 3 hours must be in studio); 12 hours of art history, criticism, and readings to include 3 hours of VASTu 598R; 3 hours of VASTu 512 or 516; 1 hour of seminar (VASTu 595R) during each semester in residence.
- File study list (including selection of graduate committee) during first semester.
- Submit slide presentation of recent work to studio faculty at conclusion of each semester. A faculty rating of satisfactory, marginal, or unsatisfac-

tory is used to determine progress and continuation in the program. Any rating combination of marginal and unsatisfactory for two semesters will result in dismissal from the program. Two marginals will result in a formal letter of probation delineating expectations and concerns necessary to obtain a satisfactory rating in the next review. Failure to receive such a rating will result in dismissal.

- At the end of the semester in which all course work except VASu 697R (MFA project) is completed, the student is required to (1) install, for approval, a preliminary exhibition; (2) have an examination to determine competency in course work; and (3) submit a written proposal for his or her final project. Successful completion of the above advances the student to candidacy, wherein he or she is authorized to execute the final MFA project.
- Final project and formal written project report: project must be produced and exhibited while enrolled in VASu 697R (MFA project). Exhibitions and written reports of final projects of all MFA candidates are required and will be held by the department at a designated time each year (usually in March).
- Examination: (A) oral defense of project; (B) written project report.

FINANCIAL ASSISTANCE

Financial assistance is available through tuition waivers, supplemental awards, and teaching assistantships.

RESOURCES AND OPPORTUNITIES

Museum of Art. BYU's new Museum of Art is itself a striking example of art. Designed both to receive and reflect light, the building's three levels feature a variety of display and instructional areas. Each area of the museum is enhanced by its setting and decor—from the permanent collection galleries to the gallery of Asian art, the intimate print and drawing gallery, the sculpture court, the musical instrument galleries, and the various gar-

dens. Of special interest to students are the study center and research library associated with the museum.

BYU's growing permanent collection contains more than 13,000 art pieces representing major artistic styles in painting, sculpture, print work, and the decorative arts. Though the collection's focus is American art, works from other cultures and periods are represented.

Art Studio Space. Studio space is provided for graduate students in all emphasis areas.

Art Resource Center. The center is an important library resource for graduate study of content, methods of inquiry, and methodology in the visual arts disciplines intrinsic to current art education programs. A wide variety of books, journals, art reproductions, curricula, and other visual materials and aids are available.

History Slide Library. A major resource for graduate student research and teaching, the slide library houses a collection of 80,000 slide reproductions of paintings, sculptures, architectural structures, and various minor arts. Furthermore, a number of students work in the library on assistantships or internships. A computerized indexing system enables a student to seek and find materials under broad categories of iconographic content—for example, art work dealing with animals, death, or certain kinds of landscapes.

For a more detailed description of the graduate program requirements, send for a copy of the department's handbook.

COURSE DESCRIPTIONS

Art Education

578R. Art Education Studio. (3)

MA courses in ceramics, drawing, figure drawing, oil painting, aqueous painting, printmaking, crafts, and sculpture.

678R. Art Education Seminar: Issues and Trends. (3)

Seminar topics emphasizing issues and trends in art education. Topics investigated, discussed, and evaluated, depending on student needs.

698R. MA Curriculum Project. (1-4)

699R. Master's Thesis. (1-6)

Art History

504. Greek Art. (3)

Consideration of formative cultures.

506. Roman Art. (3)

Art and architecture of the Etruscans and Romans.

510. Early Christian and Byzantine Art. (3)

Survey of Christian Art in the Roman and Byzantine Empires from ca. 200 to 1453.

515. Early Medieval Art. (3)

Prerequisite: VAHis 211, 212, 300, or instructor's consent.

Art and architecture of Western Europe and Islamic lands from A.D. 500 to 1050.

517. Romanesque/Gothic Art/Architecture. (3)

Major monuments in architecture, sculpture, and painting from the Romanesque and Gothic periods.

520. Italian Renaissance. (3)

Major artists, monuments, and influences of the Renaissance.

525. Northern Renaissance. (3)

Fifteenth- and sixteenth-century art in Northern Europe.

530. Southern Baroque Art. (3)

History of baroque painting, sculpture, and architecture in Italy, Spain, and France.

535. Northern Baroque Art. (3)

Baroque painting in Flanders and Holland.

540. Nineteenth-Century European Art. (3)

History of nineteenth-century art in Europe and America.

545. American Art. (3)

American painting and sculpture from colonial through modern times.

550. Modern Art. (3)

Modern European art and theory, 1900–1945.

555. Contemporary Art. (3)

Critical evaluation of trends in art since 1945.

560. Survey of Western Architecture. (3)

Critical evaluation of major movements in Western architecture.

563. English Architecture, 1485–1900. (3)

English architecture from the Tudors through the Victorian period.

565. American Architecture. (3)

Major figures, monuments, and movements in American architecture from colonial period through the "Gilded Age."

567. Modern Architecture. (3)

Critical review of the roots and evolution of modern architecture.

600R. Individual Study. (1–8)

Prerequisite: VAHis 300.

In-depth study into any chosen art historical era.

695R. Art History Seminar. (3)**698R. Master's Extended Papers. (1–6)****699R. Master's Thesis. (1–6)****Art Studio****540. Business Practices for Artists. (2)****541. Art Presentation. (3)**

Prerequisite: Visual arts foundations, levels 1 and 2)

Methods of presenting art work: archival techniques for matting works on paper; framing methods and aesthetic concerns; handling, packing, and shipping works of art; photography of art; portfolio preparation; entering competitions.

594R. Special Problems. (1–6)

Prerequisite: graduate status and instructor's and departmental consent.

595R. Seminar. (1)

Student and faculty analysis of curriculum relationships, projection of student objectives, contemporary topics, and visits to current exhibits.

596. Print Studies Workshop:**Contract Printing. (1–3)**

Prerequisite: VASu 451R (lithography studio).

Professional contract studio, producing limited edition lithographs for college collections, national galleries/museums, and investors. Business, law, and contemporary trends.

598R. Readings. (1–3)

Graduate readings in the visual arts.

621R. Graduate Drawing Studio. (1–8)

Prerequisite: admission to graduate program.

622R. Graduate Figure Drawing Studio. (1–8)

Prerequisite: VASu 621R.

627R. Graduate Painting Studio. (1–8)**650R. Graduate Printmaking Studio. (1–8)****651R. Lithograph Print Studio. (1–8).**

Refinement of technical skills, collaborative procedures, and conceptualization of image versus process in the art of lithography.

656R. Graduate Sculpture Studio. (1–8)**659R. Graduate Ceramics Studio. (1–8)****697R. MFA Project. (1–6)****Design**

The Department of Visual Arts does not offer a graduate degree in design, but offers the following graduate courses:

610R. Advanced Problems in Design. (1–8)

Prerequisite: admission by portfolio.

Individual research and project development.

630R. Advanced Problems in Industrial Design. (1–8)

Prerequisite: admission by portfolio.

Individual research and project development.

631R. Advanced Presentation Methods for Industrial Design. (1–8)

Prerequisite: admission by portfolio.

Individual research and project development.

640R. Advanced Problems in Graphic Design. (1–5)

Prerequisite: admission by portfolio.

Individual research and project development.

644R. Advanced Problems in Illustration. (1–5)

Prerequisite: admission by portfolio.

Individual research and project development.

FACULTY

ADAMS, BRENT, *Assistant Professor*. MFA, University of Utah, 1992. Computers.

ALLEN, VON D., *Associate Professor*. MFA, Syracuse University, 1983. Ceramics.

BARRETT, ROBERT, *Professor*. MFA, University of Iowa, 1976. Illustration.

BARSCH, WULF E., *Professor*. MFA, Brigham Young University, 1972. Painting.

BEATTIE, DONNA KAY, *Assistant Professor*. PhD, University of Kansas, 1990. Art Education.

BRINKERHOFF, VAL, *Associate Professor*. MFA, Utah State University, 1987. Photography.

- BULE, STEVEN**, *Associate Professor*. PhD, Ohio State University, 1987. History of Italian Renaissance; Baroque Art.
- CHRISTENSEN, BRIAN D.**, *Assistant Professor*. MFA, Washington University, St. Louis, 1992. Ceramics.
- CHRISTENSEN, JAMES C.**, *Professor*. MA, Brigham Young University, 1968. Painting.
- CINDRICH, LARRY**, *Professor*. MFA, Cranbrook Academy of Art, 1961. Foundations
- DAY, MICHAEL D.**, *Professor*. EdD, Stanford University, 1973. Art Education.
- HADLOCK, NEIL**, *Associate Professor*. MFA, Brigham Young University, 1971. Sculpture.
- HALTERN, HAGEN G.**, *Associate Professor*. MFA, Kunstakademie, Dusseldorf, Germany, 1976. Painting.
- HAMILTON, CHARLES MARK**, *Associate Professor*. PhD, Ohio State University, 1978. Architectural History; Medieval Art and Architecture.
- HILL, SHERRON D.**, *Associate Professor*. PhD, University of Iowa, 1973. Art Education.
- HONEY, PEGGY**, *Assistant Professor*. BA, Brigham Young University, 1982. Interior Design.
- HULL, RICHARD**, *Assistant Professor*. BFA, Brigham Young University, 1987. Illustration.
- JOHNSON, MARK J.**, *Associate Professor*. PhD, Princeton University, 1986. Roman, History of Early Christian and Byzantine, and Early Medieval Art and Architecture.
- KIMBALL, W. WAYNE, JR.**, *Professor*. MFA, University of Arizona, 1970. Printmaking.
- MARSHALL, JOHN**, *Professor*. MA, Brigham Young University, 1968. Industrial Design.
- MARSHALL, ROBERT L.**, *Professor*. MA, Brigham Young University, 1968. Painting.
- MYER, PETER L.**, *Professor*. MFA, University of Utah, 1959. Painting.
- OSTRAFF, JOSEPH E.**, *Assistant Professor*. MFA, University of Washington, 1982. Painting.

- PEACOCK, MARTHA**, *Associate Professor*. PhD, Ohio State University, 1989. History of Netherlandish Art.
- PULFER, ADRIAN**, *Associate Professor*. BFA, Brigham Young University, 1988. Graphic Design.
- SIPHERD, JOHN**, *Assistant Professor*. MA, California State University, Los Angeles, 1964. Interior Design.
- SMITH, BRUCE H.**, *Associate Professor*. MFA, University of Utah, 1968. Painting.
- STOUT, DOUG**, *Professor*. PhD, University of Utah, 1977. Industrial Design.
- SULLIVAN, LINDA**, *Assistant Professor*. MFA, University of Utah, 1993. Graphic Design.
- TAYLOR, DAVID**, *Associate Professor*. MA, Brigham Young University, 1982. Interior Design.
- TELFORD, JOHN**, *Assistant Professor*. MFA, University of Utah, 1988. Photography.

ZOOLOGY

Chair: Richard R. Tolman
Graduate Coordinator: Reuben Ward Rhees

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 PO Box 25254
 Provo, UT 84602-5254
 (801) 378-4145

THE PROGRAM OF STUDIES

Graduate programs in zoology address the science of all animal life—including man. Students majoring in the department increase their appreciation of nature, obtain skills of critical thinking, and learn to implement analytical judgment relevant to the biological world.

Our Zoology Department, consisting of twenty-nine faculty members, is organized into three graduate divisions based on faculty and academic expertise: Ecology and Systematics, Genetics and Developmental Biology, and Physiology and Anatomy. Graduate students in these divisions may specialize in academic and practical areas ranging from environmental science to cellular and molecular biology. Constant attention is paid to new ideas and changing methodologies that affect awareness and implementation of biological information.

The Department of Zoology offers three degrees: Biological Science Education—MS, Zoology—MS, and Zoology—PhD. The department also offers two interdepartmental degrees: Molecular Biology—MS and Molecular Biology—PhD.

Areas of specialization:

Master's Degree: Biological Science Education, Anatomy, Cell Biology, Conservation Biology, Ecology, Entomology, Genetics, Physiology, Systematics, Wildlife and Range Resources, Zoology.

PhD Degree: Anatomy, Cell Biology, Conservation Biology, Ecology, Entomology, Genetics, Physiology,

Systematics, Wildlife and Range Resources, Zoology

The Department of Zoology has approximately forty-five graduate students enrolled each year. About half will be studying in the Ecology and Systematics Division, and about half in the Cell Biology Division. Students generally complete all requirements for a master's degree within two years, whereas PhD students routinely require from three to four years beyond the MS degree to complete their doctoral program.

Admission and Entry.

All graduate programs in zoology have the same admission and entry requirements, unless otherwise stated:

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Entrance examination: GRE general test (scores must be submitted with application to be considered for regular admission). Foreign students whose native language is not English must submit TOEFL scores.

Applicants are encouraged to communicate with the Zoology Department for further information or to obtain a copy of the graduate student handbook.

Biological Science Education—MS

This MS degree program prepares graduates to become outstanding teachers of broad-based biological science at all academic levels. Furthermore, these prospective teachers are taught to address important bio-ethical and socioeconomic problems dealing with science and technology today.

Admission and Entry.

See preceding application requirements.

Requirements for Degree.

- Credit hours: minimum 24 approved course work hours plus 6 project hours (Zool 698R) for total 30 hours.

- Required courses: Zool 503, Zool 696R (1 hour).
- Project.
- Examinations: (A) oral examination on course work; (B) oral defense of project.

Zoology—MS

This MS degree program gives participants a balanced core of classes that provides them with a broad background in zoology. Research specialties cover all forms of animal life—including man—and incorporate use of a wide variety of currently used research tools to give students an in-depth study of life.

Admission and Entry.

See preceding application requirements.

Requirements for Degree.

- Credit hours: minimum 24 hours plus 6 thesis hours (Zool 699R) for a total of 30 hours.
- Required courses: Zool 503, 696R (1 hour).
- Thesis: standard university thesis format or journal publication format.
- Examinations: (A) oral defense of research; (B) oral examination on course work; (C) oral defense of thesis.

Molecular Biology—MS

This MS degree program is an interdisciplinary approach within the College of Biology and Agriculture and allows students to learn modern procedures and techniques used in research at the molecular level. Students who successfully complete the MS degree in this discipline are fully qualified and highly competitive to compete for a PhD graduate program in the same discipline at BYU or at another prestigious university.

Admission and Entry.

See preceding application requirements. Application should be made to the Molecular Biology Program, designating zoology as the specialization of

study. See Molecular Biology section of this catalog.

Requirements for Degree.

- Credit hours: minimum 24 hours plus 6 thesis hours (Zool 699R) for a total of 30 hours.
- Required courses: Zool 503, 696R (1 hour).
- Thesis: standard university thesis format or journal publication format.
- Examinations: (A) oral defense of research; (B) oral examination on course work; (C) oral defense of thesis.
- Additional required courses: for minimum degree requirements see Molecular Biology section of this catalog.

Zoology—PhD

This PhD degree program is a comprehensive academic endeavor in one of a wide variety of disciplines within general zoology. As with the MS program in zoology, a PhD program in this track permits students to research a wide variety of animals using a diversity of biological techniques. Considerable attention at the PhD program level is placed on methodical collection of research data, in-depth statistical analyses, and preparation of all material for eventual publication in peer-reviewed scientific journals.

Admission and Entry.

- See preceding application requirements.
- Prerequisite: master's degree in zoology or equivalent.

Requirements for Degree.

- Credit hours: 42 hours, including 18 hours of dissertation (Zool 799R).
- Required courses: Zool 503, 696R (1 hour).
- Skill requirement: includes 21 hours in skill subject area of foreign languages, mathematics, statistics, and/or computer science. Consult department for details.
- Dissertation: standard university dissertation format or journal publication format.

- Examinations: (A) oral defense of research; (B) written and oral examination on course work; (C) oral defense of dissertation.

Molecular Biology—PhD

This PhD degree program accepts only highly qualified individuals who have had an excellent background in molecular biology at BYU or another university. Students work with the latest technologies and most modern equipment available so that they can do extensive research in this discipline and publish their results.

Admission and Entry.

- See preceding application requirements. Application should be made to the Molecular Biology Program, designating zoology as the specialization of study. See Molecular Biology section of this catalog.

Requirements for Degree.

- Credit hours: 42 hours, including 18 hours of dissertation (Zool 799R).
- Required courses: Zool 503, 696R (1 hour).
- Skill requirement: includes 21 hours in skill subject area of foreign languages, mathematics, statistics, and/or computer science. Consult department for details.
- Dissertation: standard university dissertation format or journal publication format.
- Examinations: (A) oral defense of research; (B) written and oral examination on course work; (C) oral defense of dissertation.
- Additional required courses: for minimum degree requirements, see Molecular Biology section of this catalog.

FINANCIAL ASSISTANCE

The Department of Zoology offers the following financial aid: teaching assistantships, research assistantships, and tuition awards. Specific endowment fund awards in natural history, physiology and anatomy, and general zoology are also available.

RESOURCES AND OPPORTUNITIES

Program and degree resources include not only the laboratories and equipment within the John A. Widtsoe Building, but also such facilities as the following: (1) the Monte L. Bean Life Science Museum (located on the BYU campus), with important and significant collections of over 1 million insects, 3 million noninsect arthropods, and thousands of marine invertebrates, amphibians, reptiles, fish, birds, and mammals; (2) the Electron Microscope Laboratory (also on campus), with both transmission and scanning microscopes equipped with X-ray microanalysis, image processing, and electron channeling capabilities, and (3) the Lytle Ranch Preserve (in southwestern Utah), comprising 572 acres of land located in a transition zone between the Mojave Desert and the Great Basin ecosystems.

In addition, graduate students in our department have direct access to other facilities listed for our College of Biology and Agriculture (such as the Benson Agriculture and Food Institute), as well as others that have been made available through long-term association with members of our own faculty (such as the marine laboratories at Friday Harbor, Washington, or at Stanford, California). The Benmore Experiment Station, Dugway Proving Grounds, Desert Range Experiment Station, and Ephraim Experiment Station are federally owned public field stations that are also used for ecology and environmental impact research programs.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

503. Research Orientation. (1)

Departmental graduate procedures; techniques used in researching zoological literature. Students must register for this class the first fall semester of their graduate studies.

515R. Science In-Service. (1-5)

In-service course for science teachers. Subjects that may be offered include:

- Advanced Topics Science In-Service
- Ecology Science In-Service
- Genetics Science In-Service
- Evolution Science In-Service
- Botany Science In-Service
- Meteorology Science In-Service

526. (Zool-Botny) Cell Biology. (3)

Prerequisite: introductory course in biochemistry.

Molecular physiology and ultrastructure of cells, emphasizing eukaryotic organisms.

532. Insect Classification. (4)

Prerequisite: Zool 331. Recommended: Zool 330.

Insect systematics, emphasizing external morphology, natural history, evolution, distribution, and phylogeny. Insect collection required.

536. Comparative Toxicology. (3)

Prerequisite: general biology and a course in organic chemistry.

Modes of action and biological transformations of pesticides in living animals, plants, and the environment, emphasizing techniques.

537. Aquatic Entomology. (3)

Prerequisite: Zool 331 or equivalent.

Morphology, classification, biology, and functional ecology of aquatic insects.

540. Zoogeography. (2)

Prerequisite: Zool 204.

Methods for analyzing distribution of animals; review of distribution of major animal groups with some emphasis on island biogeography as a critical principle.

546. World Bird Families. (4)

Prerequisite: Zool 446 or instructor's consent.

Distribution, composition, and characteristics of world bird families, using museum specimens.

547. Raptor Biology. (2-4)

Prerequisite: Zool 446 or instructor's consent.

Biology and conservation of major groups of predatory birds, using museum specimens.

549R. Advanced Topics in Zoology. (1-4)

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Anatomical Preparations
- Histological Techniques
- Diseases of Fish
- Advanced Mammalogy
- Advanced Ornithology
- Wildlife Diseases

556. Limnology. (4)

Prerequisite: Zool 350.

Biotic and physical-chemical properties of lakes and streams. Saturday field trips required.

559R. Advanced Topics in Ecology and Systematics. (1-4)

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Advanced Ecology
- Tropical Biology
- Evolutionary Biology
- Field Methods

561. Physiology and Drug Mechanisms. (3)

Prerequisite: Zool 460 or instructor's consent.

Function and regulation of organ systems in mammals. Relationship between normal functions and biological and physiological effects of drugs.

562. Neurophysiology. (3)

Prerequisite: Zool 460 or equivalent.

Structure and function of central and peripheral nervous systems.

565. Endocrinology. (3)

Prerequisite: Zool 460 or equivalent.

Study of mammalian hormones.

566. Experimental Endocrinology. (2)

Prerequisite: Zool 565. Recommended: Chem 481.

Techniques used in research.

569R. Advanced Topics in Entomology. (1-4)

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Insect Taxonomy
- Insect Ecology
- Insect Physiology
- Acarology

572. Gene Regulation. (2)

Prerequisite: Zool 342.

Molecular basis of gene regulation in eukaryotic cells. Emphasis on transcriptional and post-transcriptional controls in nuclear and organellar genomes of animals and plants.

579R. Advanced Topics in Genetics. (1-4)

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Molecular Evolution
- Teratology Techniques

585. Developmental Biology. (3)

Prerequisite: Botny-Mcbio-Zool 341, 342.

Cellular and biochemical mechanisms that achieve differentiation in the developing embryo.

589R. Advanced Topics in Physiology. (1-4)

Prerequisite: instructor's consent.

591R. Special Problems in Zoology. (1-2)

Prerequisite: instructor's consent.

601. Genetics of Natural Populations. (4)

Prerequisite: Zool 475 or equivalent.

Basic principles of population genetics applied to natural populations; drift, selection, and nonrandom mating; inferring population subdivision, migration, and gene flow.

602. Theoretical Ecology. (4)

Theoretical foundations of evolutionary ecology; understanding ecological theory.

603. Ecological Data Analysis. (4)

Prerequisite: Stat 501.

Practical quantitative methods necessary to analyze ecological data. Use of computer software for statistical analysis.

604. Phylogenetic Systematics. (3)

Prerequisite: Zool 475 or equivalent.

Theoretical foundations of modern systematics, methods of phylogenetic inference, and discussion of contemporary literature.

605. Molecular Methods in Systematics and Population Biology. (5)

Prerequisite: Zool 475 or equivalent.

Introduction to current molecular methods in systematics and population biology; emphasis on laboratory techniques in isozyme analysis.

661. Reproduction and Endocrinology. (2).

Prerequisite: Zool 460 or equivalent.

Advanced course based on current research literature.

662. Renal and Gastrointestinal Physiology. (2)

Prerequisite: Zool 460 or equivalent.

Advanced course based on current research literature.

664. Cardiovascular and Respiratory Physiology. (2)

Prerequisite: Zool 460 or equivalent.

Advanced course based on current research literature.

696R. Graduate Seminar. (0.5)

Topics vary. See current class schedule.

698R. Master's Project. (Arr.)**699R. Master's Thesis. (1-9.)****799R. Doctoral Dissertation. (1-18)**

FACULTY

- ANDERSEN, FERRON L., *Professor*. PhD, Utah State University, 1963. Parasitology.
- BARNES, JAMES R., *Professor*. PhD, Oregon State University, 1972. Aquatic Ecology.
- BAUMANN, RICHARD W., *Professor*. PhD, University of Utah, 1970. Aquatic Insect Systematics; Biology; Distribution.
- BELK, MARK C., *Assistant Professor*. PhD, University of Georgia, 1992. Evolution Ecology; Life History Evolution.
- BELL, JOHN D., *Assistant Professor*. PhD, University of California, San Diego, 1987. Pharmacology; Membrane Physiology.
- BENNETT, RANDY L., *Assistant Professor*. PhD, University of Wisconsin, Madison, 1993. Oncology; Molecular Developmental Biology; Genetics.
- BLACK, HAL L., *Professor*. PhD, University of New Mexico, 1972. Ecology; Mammalogy.
- BOOTH, GARY M., *Professor*. PhD, University of California, Riverside, 1969. Insect Physiology; Toxicology.
- BRADSHAW, WILLIAM S., *Professor*. PhD, University of Illinois, 1968. Developmental Biology.
- BRAITHWAITE, LEE F., *Associate Professor*. PhD, Brigham Young University, 1970. Marine Biology.
- BUSATH, DAVID D., *Associate Professor*. MD, University of Utah, 1978. Electrophysiology; Molecular Modeling; Molecular Biophysics.
- CRANDALL, KEITH A., *Assistant Professor*. PhD, Washington University, 1993. Population Genetics; Molecular Evolution; Conservation Biology.
- EVANS, R. PAUL, *Assistant Professor*. PhD, Medical College of Virginia, 1983. Molecular Biology.
- FARMER, JAMES L., *Professor*. PhD, Brown University, 1966. Molecular Genetics.
- HECKMANN, RICHARD A., *Professor*. PhD, Montana State University, 1970. Fish Diseases; Parasitology.
- HENINGER, RICHARD W., *Professor*. PhD, Oklahoma State University, 1961. Physiology; Endocrinology.
- JEFFERY, DUANE E., *Professor*. PhD, University of California, Berkeley, 1972. Ecological; Evolutionary Genetics.
- JUDD, ALLAN M., *Assistant Professor*. PhD, West Virginia University, 1981. Physiology; Neuroendocrinology.
- LEPHART, EDWIN D., *Assistant Professor*. PhD, University of Texas Southwest Medical Center, 1989. Neuroendocrinology.
- MAURER, BRIAN A., *Associate Professor*. PhD, University of Arizona, 1984. Population and Community Ecology.
- RHEES, REUBEN WARD, *Professor*. PhD, Colorado State University, 1971. Neuroendocrinology; Physiology.
- ROGERS, DUKE S., *Associate Professor*. PhD, University of California, Berkeley, 1986. Phylogenetic Systematics—Mammalogy.
- SEEGMILLER, ROBERT E., *Professor*. PhD, McGill University, Canada, 1970. Developmental Biology; Teratology.
- SHIOZAWA, DENNIS KENJI, *Associate Professor*. PhD, University of Minnesota, St. Paul, 1978. Aquatic Ecology; Ichthyology.
- SITES, JACK W., JR., *Professor*. PhD, Texas A&M University, 1980. Evolutionary Genetics; Vertebrate Biology.
- SMITH, H. DUANE, *Professor*. PhD, University of Illinois, 1969. Mammalian Ecology; Wildlife Management.
- TOLMAN, RICHARD R., *Professor*. PhD, Oregon State University, 1969. Science Education.
- WHITE, CLAYTON M., *Professor*. PhD, University of Utah, 1968. Raptor Biology; Ornithology; Avian Systematics and Evolution.
- WHITEHEAD, ARMAND T., *Associate Professor*. PhD, University of California, Berkeley, 1969. Entomology; Insect Physiology.
- WINDER, WILLIAM W., *Professor*. PhD, Brigham Young University, 1971. Exercise Physiology and Endocrinology.

FACULTY

Abbott, Scott	137
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Bruce Higley
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